United States Department of Agriculture

Forest Service

Pacific Southwest Region

In cooperation with:

U.S.D.A. Soil Conservation Service

California Department of Forestry

Regents of the University of California (Agricultural Experiment Station)

Soil Survey
Eldorado National Forest California

How To Use This Soil Survey

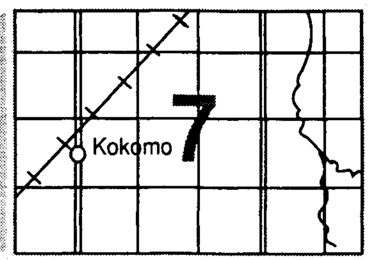
General Soil Map

The general soil map, which is the small scale map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

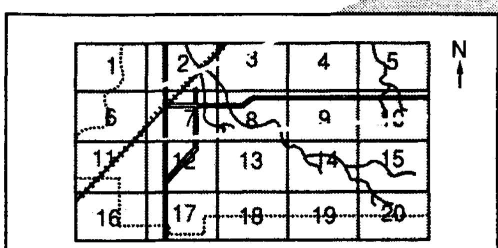
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



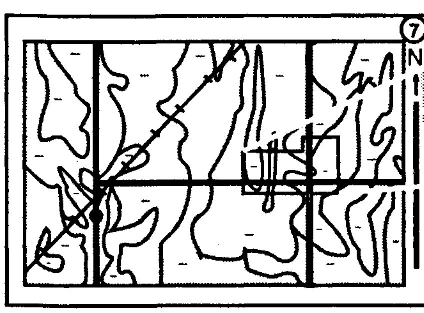
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

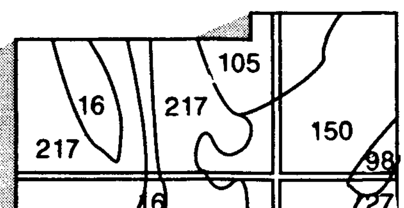


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This Soil Survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture (U.S. Forest Service and Soil Conservation Service), the California Department of Forestry (Soil-Vegetation Survey), and the Regents of the University of California (Agricultural Experiment Stations). The field work was conducted by the Forest Service and California Department of Forestry. The technical quality control for this survey was by the Forest Service. The correlation of the soils was conducted by the Soil Conservation Service in consultation with the Forest Service and the California Department of Forestry. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, martial status or age.

Major field work for this survey was performed in the period 1974-84. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to the conditions in the survey area in 1984. This survey was made cooperatively by the Forest Service, the Soil Conservation Service, and the California Department of Forestry. The survey area consists of the major portion of the Eldorado National Forest and all private land holdings within the survey boundary in Alpine, Amador, El Dorado, and Placer Counties.

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Foreword

The Soil Survey of Eldorado National Forest Area, California, in parts of Alpine, Amador, El Dorado and Placer Counties, was designed to facilitate forestwide resource management planning and to increase the knowledge of our environment. It contains predictions of soil behavior for selected land uses. It also points out inherent limitations or hazards to land uses.

This soil survey has been prepared primarily for forest resource planners and managers. It is useful for prelimary project planning, for identifying general soil management considerations, and for evaluation of more intensive soil survey needs. The survey could be used for detailed resource management and project level planning with field verification.

Major differences in soil properties can occur even within short distances. Some soils are shallow to bedrock and have low available water capacity.
These conditions inhibit plant growth. Some soils are seasonally wet and have a high water table or are subject to flooding.

Soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each detailed soil map unit is shown on detailed soil maps. Each kind of soil in the survey area is described and information is given about each soil for specific uses.

This soil survey can be useful in the conservation, improvement, and productive use of soil, water, and other resources.

JOHN PHIPPS
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Soil Survey of Eldorado National Forest Area, California

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Soils survey by Charles R. Mitchell, Kathryn J. Silverman, Ann L. Denton and Susan Hoffman, Forest Service

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General Nature of the Survey Area

This section describes the physiography, relief, and drainage, the geology, and the geomorphic history of the survey area. It also gives some important facts about the history and development, climate and vegetation of the survey area.

History and Developments

This section was prepared by Dana E. Supernowicz, United States Forest Service Historian, Eldorado National Forest.

At the time of European contact, the native peoples living within the survey area belonged to the Southern Maidu or Nisenan, Northern Sierra Miwok, and Washo language groups. The subsistence patterns of these native peoples were related to the annual harvesting of acorns and pine nuts, while hunting and fishing took place year around. Archaeological and botanical evidence suggests native peoples practiced forms of "burning" to reduce the chapparal and brush, encourage new production and drive game into nets or area where they could be easily killed. Their territory encompassed the entire present-day boundaries of the Eldorado National Forest.

Neither the Spanish nor the Mexican governments undertook a thorough exploration of the Mother Lode region or the mountains of the Sierra. Spanish expeditions into the Central Valley during the 1770's, such as the expedition of Captain Pedro Pages and Fray Juan Crespi, only caught a glimpse of the Sierra Nevada. During the nineteenth century Anglo-Americans attempted to cross the Sierra. In 1826 Jedediah Smith made the first west to east crossing and in 1844, John Fremont and Christopher "Kit" Carson crossed from east to west near the present-day Carson Pass.

In 1848 a group of Mormons, having been present at the site where gold was discovered, mined for gold for a short time after the discovery, but soon felt a need to return to Salt Lake City. Hearing negative accounts of the Truckee Route, they were determined to locate a new and hopefully safer route over the Sierra. Following the present-day Iron Mt. Ridge the entire party arrived at a spring, which they named "Tragedy" after discovering the mutilated bodies of the three scouts Browett, Allen, and Cox. The route established by the Mormon Battalion lead to the development of the trail as a major wagon road between 1849-1854.

Although explorers reached the present-day Eldorado National Forest during the 1820's, significant development of the forest environment did not occur until thirty years later. The Eldorado National Forest, located in the Central Sierra and the heart of the Mother Lode, was the nucleus for rapid and unprecedented population expansion. From the onset of the Gold Rush the lands encompassing the Forest have sustained a multitude of people of varying nationalities and occupations. During the early 1850's El Dorado County boasted one of the largest populations in the State.

Several years after the discovery of gold at Sutter's Mill, food production developed as a secondary industry. The development of ranches and the cultivation of orchards

helped sustain the growing population of the Mother Lode during the 1850's. In 1856 the *Sacramento Union* reported that William Tanner proposed to plant an extensive fruit orchard near Weberville. The range in which fruit can be grown in the central Sierra is limited to lower elevations, since orchards above 4,000 feet are subject to heavy snows and frosts that destroy the fruit and kill the trees. Certain soils were more compatible with fruit production. The Camino, Mosquito, Coloma, Gold Hill, Missouri Flat, Placerville, Pleasant Valley, and Fairplay areas contain deep residual soils that were productive under cultivation. By the 1860's cultivation, logging, and the introduction of new crops and grasses had modified the surrounding environment in the Sierra foothills. Forests as low as Shingle Springs were cleared out in the 1850's and later became open fields and oak-grassland environments. At the higher elevations dairies were established, supplying milk, butter and cheeses to the mining camps.

The location, type, and complexity of camps, towns, and activities were greatly influenced by both the physical and climatic environment within the study area. The forested mountain area of El Dorado, Amador, Placer, and Alpine counties provided an abundance of cheap forest products and food, while the topography of the four counties determined the types and diversity of minerals available for exploitation.

Taking advantage of these conditions, miners, agriculturalists, and merchants settled the foothills and forests, which were previously inhabited by native peoples. Mining communities dependent upon mineral resources were unstable as a direct result of the availability of these resources. However, mining boom towns, such as Placerville, survived and prospered during the mining decline of the mid-1850's, because of the camp's central location linked to a regional and nationwide wagon road network. Other communties not so fortunate drastically declined in population after 1860, such as Grizzly Flats, Volcanoville, Weberville, Cedarville, as well as hundreds of other mining camps, some of which only lasted several years.

Throughout the late nineteenth century land speculators purchased immense tracts of land throughout the eastern and western slopes of the Sierra Nevada. Many hoped to acquire large blocks of land adjacent to the railroad land grants, which formed an unmistakable checkerboard pattern in El Dorado, Placer, and Nevada counties. Both timber and mineral exploitation occurred within these blocks; however, timber provided the bulk of the products shipped out of the study area, as well as the largest revenue distributed to the counties after 1900. Two timber companys operated logging railroads; the Michigan-California lumber Company out of Camino and the California Door Company at Caldor and later Diamond Springs.

The massive depletion of timber resources in the West during the late nineteenth century persuaded the United States Congress to pass legislation aimed at reducing the wasteful practice of timber exploitation. In March 1885 California created a forest board to demonstrate through education and research the proper methods of managing timber resources. Six years later the Forest Reserve Act was passed authorizing the President to set aside forest reserves from the public domain. In 1894 the Stanislaus Forest Reserve was established, followed by the Lake Tahoe Forest Reserve in 1899. In 1905 the Stanislaus Forest Reserve transfered a portion of its land to Yosemite National Park, and the Lake Tahoe Forest Reserve redescribed its boundary and changed its name to the Tahoe Forest Reserve. Two years later the forest reserves were changed to "national forests." With additional lands added to the Tahoe and Stanislaus National Forests after 1907, the management of both forests became difficult due to their extended size. On July 28, 1910, to help minimize the problem, President Taft established the Eldorado National Forest from portions of the Tahoe and Stanislaus National Forests.

Between 1910 and 1940 a number of significant bills were authorized, many of which dealth with land acquisition and exchange, reforestation, grazing, and emergency conservation work. The effects of such legislation was monumental. The key to the management of the national forest was regulating the uses which occurred within the forest. The goals and mission of the Forest Service had an unprecedented impact on the people living in or familar with the forested regions of California.

Geology and Geomorphic History

The following summary of the geologic and geomorphic history can be helpful in understanding the relationship between parent materials and relief in the survey area. Figure 1 illustrates the typical geology of the survey area.

The Eldorado National Forest Area is in the Sierra Nevada geomorphic province and lies on the western slope of the Sierra Nevada range. Early in geologic time, in the late Paleozoic period, the area was covered by a vast inland sea in which large amounts of several kinds of sediment were deposited. The sediment of this sea was uplifted, and intense folding and metamorphism followed. As a result the Shoo Fly Complex (S2), a nearly continuous belts of vertically tilted undifferentiated metamorphic rock, was formed with ridges extending generally to the northwest. The fine grained sedimentary rock was changed to slate; siliceous sediment,

Location of the Eldorado National Forest Area, California

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to quartzites and metacherts; volcanic rock, to amphibolite schists and greenstone; and calcareous ooze, to crystalline limestone. Isolated bodies of early to middle Jurassic age metavolcanic, metasedimentary, and sparse carbonate rock occur in the eastern portion of the survey area as roof pendants (S3). These rocks lie with angular unconformity over the Shoo Fly Complex to the west and are generally surrounded by the granitic batholith to the east.

Then the Area was intruded by ultrabasic rock, most of which was altered to serpentine. Soon there after a sequence of granitic-type rocks was emplaced on a major scale, beginning with the more basic gabbrodiorite and followed by the more acid granodiorite. At that time slopes in the Area were alined more gently westward than they are today. The crest of the Sierra Nevada, however, was approximately in its present location. Then the surface of the folded sedimentary and volvanic rock was lowered throughout by a long period of erosion, and large areas of the granitic batholith (S1) became exposed.

The volcanic activity began in the Sierra Nevada in the late Eocene period. Rhyolitic ash fell at the lower elevations and at the higher elevations; both flows and ash falls were deposited. These ash falls and flows formed the Valley Springs formation. This formation choked the stream channels, and the drainage system was completely changed. After the rhyolithic emissions, the volcanoes began to discharge andesitic material, mostly mud flows, dust, and lava flows. These flows formed the Mehrten formation (S4), a andesetic lahar, that again choked the streams, and new drainage ways formed. The geologic activity of this time marked the beginning of the present land forms and had a strong influence in forming the soil patterns in the Area.

In Pleistocene times, a major uplift of the Sierra Nevada Range was caused by faulting along the Range's east flank. The western slope was uniformly tilted upwards. Then the west-flowing rivers and streams in the newly uplifted area removed much of the volcanic debris and cut deep canyons into the underlying materials, leaving long, tabular, volcanic ridges and exposures of tertiary river gravel, rhyolitic tuff, and granitic and metamorphic rock. From the crest down to 4,800 feet glaciation was also taking place. Large areas of glaciated granitic rock were exposed, sculpturing the present day crest zone. Glacial till and outwash material was deposited in basins and along drainages on the western edge of the crest glaciation.

Physiography, Relief, and Drainage

The Eldorado National Forest Area is in the western part of the central Sierra Nevada. The survey area is dominated by a glacially sculptured granitic crest zone, gently sloping volcanic ridges at the mid-elevations, and steeply dipping, faulted and folded metamorphic rocks on the western edge. Overlying the bedrock in many places are mantles of river gravels, glacial deposits, and volcanic debris.

The ascent from the Central Valley is gently sloping, and the average slope through a west-to-east transect is about 5 percent. In general, the trends of the ridges and rock formations is northwest by southeast. Drainage is generally toward the southwest, and the drainage channels have cut through geologic formations and followed the westward tilting of the Sierra fault block. The headwaters of the major drainages start in the glaciated crest zone and descend though the gently sloping volcanic and granitics to the deeply entrenched V-shaped metamorphic canyons on the western edge of the survey area. Typically, landforms in the folded and faulted areas of metamorphic rocks are steep and angular, in the granitics they are rounded and smooth with a basin-like appearance, and in the volcanic areas they are flat topped and smooth.

The survey area is drained mainly by the Middle and South Forks of the American River, the Consumnes River, and the Mokelumne River. There are many major perennial streams in these drainage areas.

Climate

The survey area is characterized by a Mediterranean climate with abundant sunshine in summer, moderate to heavy precipitation in winter, and a wide temperature range. The area is subject to strong flows of marine air from the Pacific Ocean in winter, which results in heavy precipitation particularly at intermediate elevations in the mountains. At high elevations much of the precipitation falls as snow, providing a water supply that lasts into summer. Precipitation in summer is light and generally is limited to a few scattered thunder showers.

The Sierra Nevada range plays a dominant role in determing the climate in the survey area. Differences in elevation affect both temperature and precipitation on the western slopes of the mountains. Precipitation

tends to increase with elevation and temperature decreases with elevation, except that some of the valleys are cooler than the slopes above them at night because of cold-air drainage.

The average annual temperature in the survey area ranges from above 55° F at the lower elevations to about 39° F near the crest. The average minimum temperatures in January decrease from about 32° F at the lower elevations to about 16° F at the higher elevations. Minimum temperatures are affected by local differences in the terrain. Average maximum temperatures in July range from about 72° F at the higher elevations to nearly 88° F at the lower elevations.

The growing season, which is the interval between the last temperature of 32° or lower in spring and first in fall, ranges from 50 to 175 days. The average date of the last freezing temperature in spring is about the 1st of May at the lower elevations and about the last of June at the higher elevation. In fall the average date of the first freezing temperatures ranges from the early part of August in the cooler parts of the survey area to the first of November in the warmer part. The average length of the growing season is shown in Figure 2.

Mean annual precipitation ranges from 40 to 70 inches with the majority of it falling between November and April. Figure 3 shows the mean annual precipitation for the survey area.

Vegetation

The CALVEG (7) classification system is used to describe the vegetation. The following list describes the CALVEG series found in the survey area.

Conifer Forest/Woodland

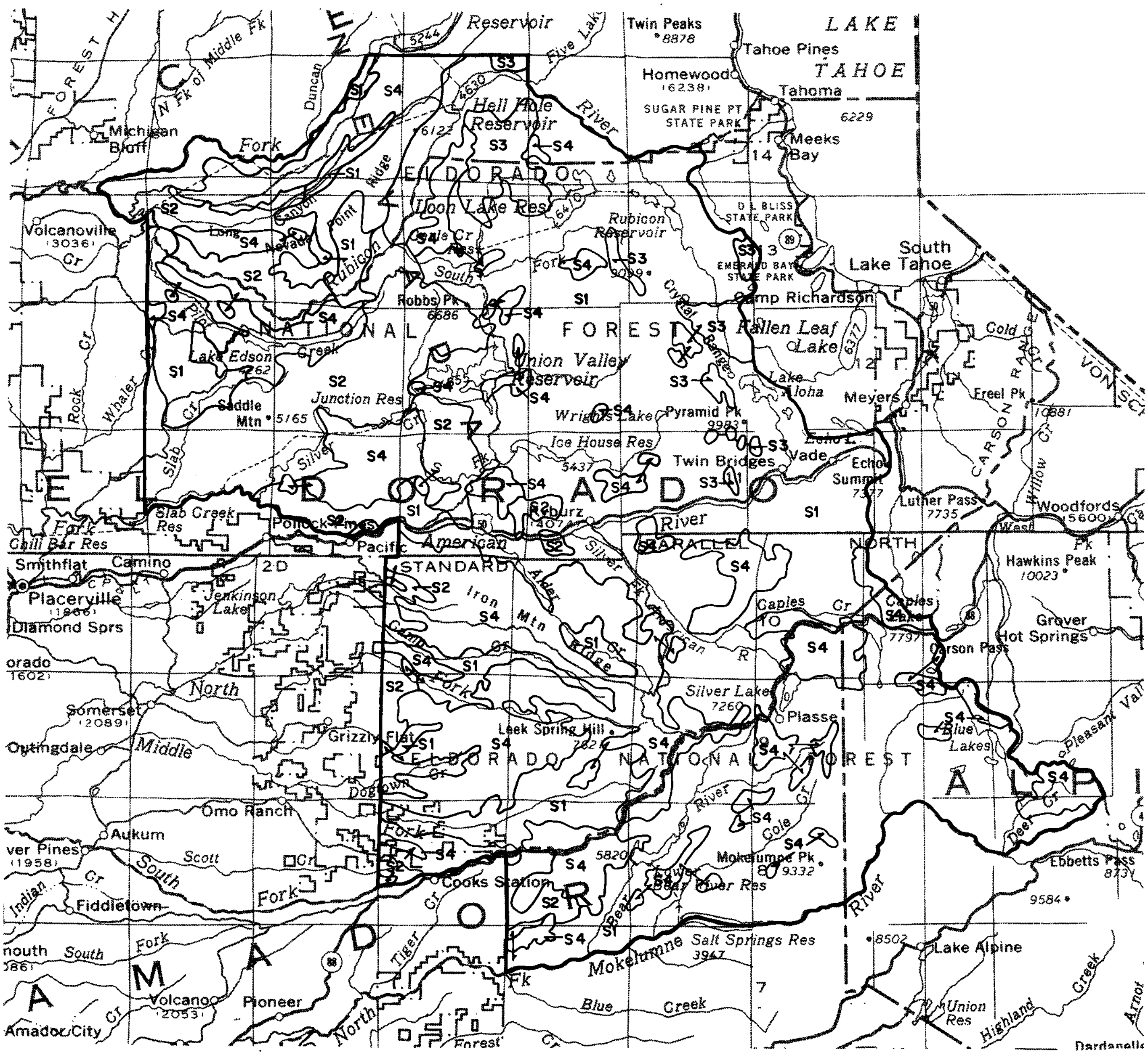
Mixed Conifer-Fir series. This is the high elevation counterpart of the Mixed Conifer-Pine series. Within the elevational range of 4,800 to 7,500 feet, on frigid soils, the major species include white fir (*Abies concolor*), red fir (*Abies magnifica*), sugar pine (*Pinus lambertiana*), and Jeffrey pine (*Pinus jeffreyi*). The lower elevations within this range are primarily dominated by white fir and Jeffrey pine. In the higher elevations red fir becomes more dominant, however Jeffrey pine and white fir will continue to occur in decreasing amounts. Greenleaf manzanita (*Arctostaphylos patula*), huckleberry oak (*Quercus vaccinifolia*), and mountain whitethorn (*Ceanothus cordulatus*) are the associated understory shrubs.

Red Fir series. This series generally occurs as dense, pure stands or as an inclusion in the Mixed Conifer-Fir series. This series is found from about 5,600 feet to 10,000 feet on frigid soils. In dense red fir stands with heavy litter accumulation, understory plants do not occur except for *Pipsissewa* and wintergreen (*Chimaphila menziesii* and *Pyrola picta*). In more open stands or where red fir intergrades with Mixed Conifer-Fir, mountain whitethorn, pinemat manzanita (*Arctostaphylos* nevadensis), and greenleaf manzanita are the dominant understory shrubs. Western white pine (*P. monticola*) and lodgepole pine (*P. contorta var. murrayana*) are associated conifer species. Mountain hemlock (*Tsuga mertensiana*) may occur as isolated trees in colder areas of the red fir series.

Mountain Hemlock series. Mountain hemlock (*Tsuga mertensiana*) the dominant of this series, is representative of cryic areas. It is generally found on north or east facing slopes where snow accumulation holds well into the summer months. It occurs as a dominant species in cold swales from 6,400 feet to 8,800 feet, and in almost pure open stands on ridgetops above 8,500 feet with western white pine (*Pinus monticola*). In moist areas willows (*Salix spp.*) and mountain alder (*Alnus tenuifolia*) are associated understory species.

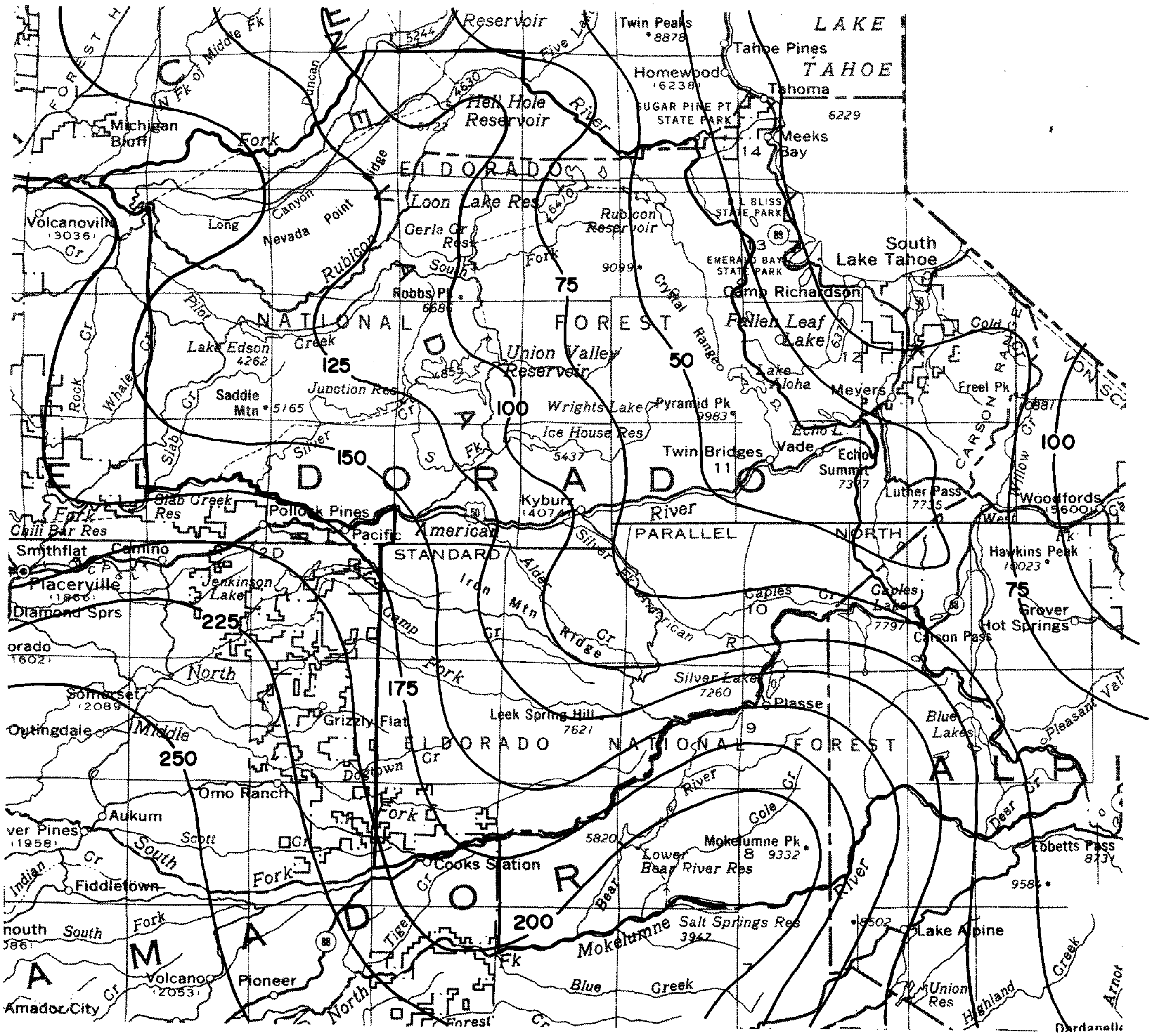
Lodgepole Pine series. This series occurs intermingled with the Red Fir Series and the Mixed Conifer-Fir series at elevations from 5,000 feet to 9,000 feet or on cryic soils above 9,000 feet. Lodgepole pine (*Pinus contorta var. murrayana*) is found either in dense, pure stands in swales with abundant year around moisture or as scattered individual trees on very dry soils. Lodgepole is an invader species and as the microsite changes, it may be replaced by red fir, Jeffrey pine or white fir. In the periphery of meadows, as the water table level drops, lodgepole will replace the sedge and forb species. The occurence of lodgepole generally indicates environmental conditions outside the establishment and growth requirements of white fir, red fir or jeffrey pine.

Mixed Conifer-Pine series. This series dominates the western slopes at elevations between 2,000 feet and 6,500 feet on mesic soils. Major conifer species include ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), and incense cedar (*Libocedrus decurrens*). Sugar pine (*P. lambertiana*) and white fir (*Abies concolor*) are common associates at the higher elevations. Black oak (*Quercus kelloggii*) may occur as a major component at lower elevations. These species mix freely. The pines normally dominate the south and west facing slopes, and Douglas-fir and white fir dominate the north and east slopes, with incense cedar as a secondary component of all slopes. Understory shrubs within this series include deerbrush, indian manzanita, whiteleaf manzanita, and at higher elevations greenleaf manzanita.

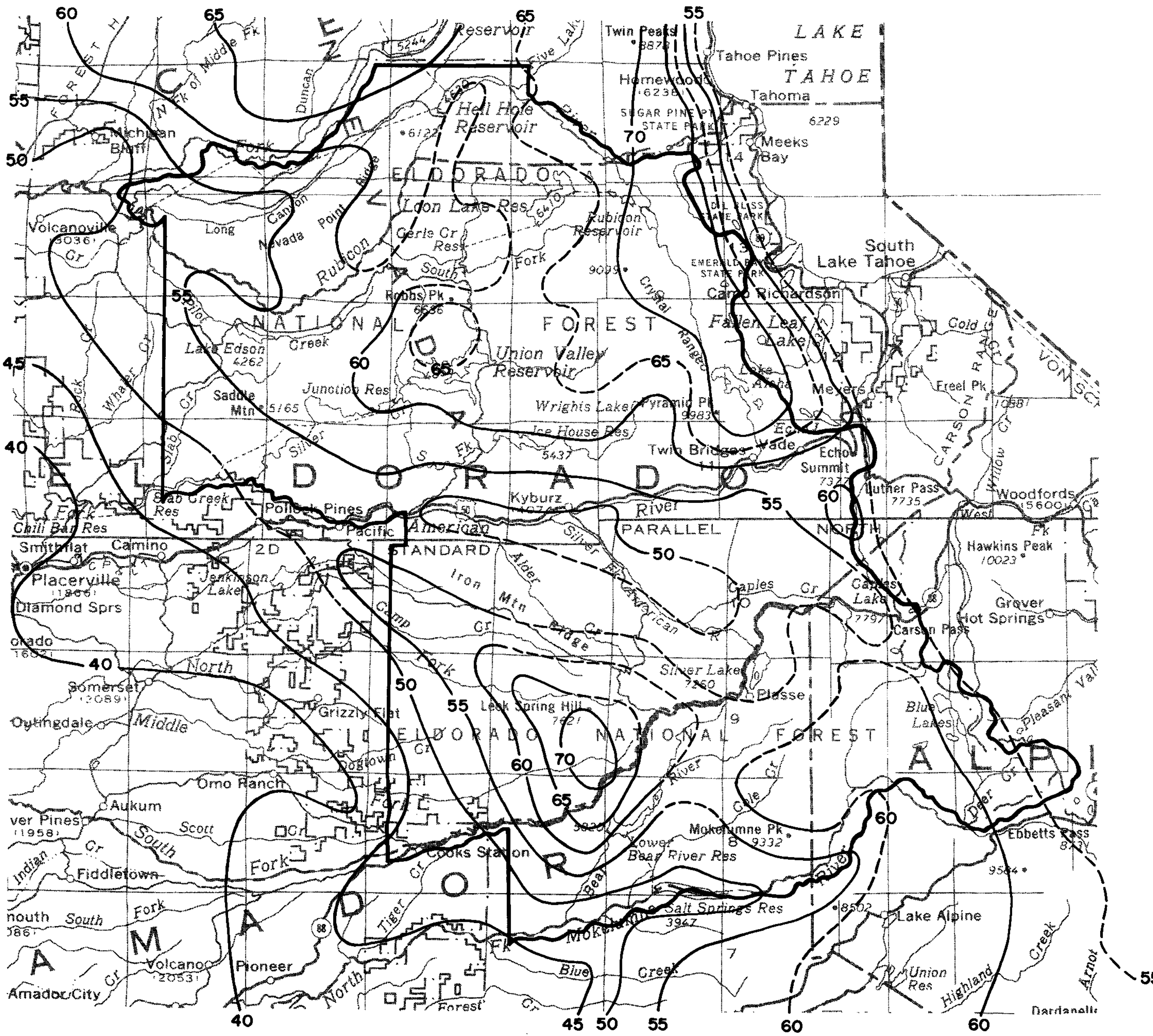


General Geology
Eldorado National Forest Area

S1 Granitic Batholith
S2 Shoo Fly Complex
S3 Roof Pendants
S4 Mehrten Formation



Average Number of Days in Growing Season
Eldorado National Forest Area



Mean Annual Precipitation
Eldorado National Forest Area

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Hardwood Forest/Woodland

Alder series. White alder (*Alnus tenuifolia*) is a dominant high elevation riparian species, generally located above 5500 feet, but it ranges from 2,000 to 7,500 feet. This series is located on stream banks and meadows adjacent to red fir and lodgepole pine. The Alder series is readily located in large perennial grass meadows where stream courses exist. Willow (*Salix spp.*) occurs as an associate.

Canyon Live Oak series. This series is dominated by canyon live oak (*Quercus chrysolepis*) and occurs on droughty sites. This series is found on shallow colluvial soils in steep canyons generally between 2,000 feet and 5,500 feet. This hardwood is occasionally associated with the Mixed Conifer-Pine and Black Oak series. Mixed shrubs (*Ceanothus integerrimus* and *Arctostaphylos viscida*) will occur in the understory, as will grasses. The tree form of California bay and digger pine (*Pinus sabiniana*) also occur as minor components.

Maple-Alder-Dogwood series. This combination of hardwoods (*Acer macrophyllum*, *Alnus rhombifolia*, and *Cornus nuttallii*) identifies a riparian series. Elevational range is from 2,000 feet to 5,000 feet on mesic soils. These hardwoods are generally located along perennial streams, seeps, and in canyon bottoms. Both maple and dogwood occur as understory species within the Mixed Conifer-Pine series. These riparian associated species also occur in stringers with manzanita and ceanothus.

Willow series. This series (*Salix spp.*) occurs in high elevation riparian areas, generally from 6,000 to 9,500 feet. This riparian series is generally located on streambanks, meadows, and moist canyon bottoms adjacent to the Red Fir and Lodgepole Pine series. The Willow series is easily found in stringers adjacent to streamcourses which meander through perennial grass meadows. White alder occurs as an associate.

Chaparral

Huckleberry Oak series. Huckleberry oak (*Quercus vaccinifolia*) occurs on shallow, xeric, and frigid soils of rocky south and west facing slopes. This series is a good indicator of poor growing sites. Elevational range is from 5,400 feet to 7,800 feet and above. Bush chinquapin, greenleaf manzanita, mountain whitethorn, and bitter cherry are the associated shrub species. Conifer species, if present, are Jeffrey pine, red fir, and western white pine.

Greenleaf Manzanita series. Greenleaf manzanita (*Arctostaphylos patula*), a stump-sprouter, occurs in pure stands and scattered throughout the Mixed Conifer-Fir series. Associated species are pinemat manzanita (*A. nevadensis*), mountain whitethorn, bitter cherry, and bush chinquapin (*Castanopsis sempervirens*). This series is found from 3,000 feet to 6,000 feet in Plumas County and below 5,000 feet in Amador County. It generally invades the frigid soils of the south and west facing Sierran slopes between 2,000 feet and 6,000 feet.

Mountain Whitethorn series. Mountain Whitethorn, sometimes referred to as Snow Bush (*Ceanothus cordulatus*), occurs on dry open flats and slopes from 2,400 feet to 8,500 feet. This series may occur in pure stands or may occur with Greenleaf Manzanita, Pinemat Manzanita, and Bitter Cherry as associates.

Herbaceous

Mule Ears series. Mule ears (*Wyethia mollis*) is typically located throughout the Red Fir and Mixed Conifer-Fir series as an understory species and dominates openings with gravelly coarse textured soils. Mule ears occasionally associates with other herbs such as rockcress (*Arabis platysperma*), violet (*Viola purpurea*), monardella (*Monardella odoratissima*), and buckwheat (*Eriogonum latifolia* ssp. *nudum*).

Sedge-Rush series. This wet meadow series occurs on level or gently sloping areas with year around moisture. It also occurs adjacent to streams, meadows, lakes, and occasionally as an understory to lodgepole pine in wet swales. Dominant species are sedges (*Carex spp.*) and rushes (*Juncus spp.*) as well as water tolerant grass and forb species.

How This Survey Was Made

This soil survey has followed the directives and guidelines in the Forest Service Manual and Handbooks. It has also followed the concepts, procedures, and guidelines of the National Cooperative Soil Survey as specified in the *Soil Survey Manual* (10), the *National Soils Handbook* (9), and the soil classification system as stated in *Soil Taxonomy* (12).

Soil Scientists began the inventory by collecting, studying, and correlating all the existing data and information concerning the survey area that is related to soil genesis and morphology. This included lithological, gemorphological, topographical and elevational, climatic, vegetative, and existing soil survey data both within and adjoining the survey area.

This data and information was assimilated and transferred to a single base map of suitable scale and accuracy forming the beginning soil map unit delineations or a schematic map. With the schematic map and aerial photo field sheets (stereo-pair coverage) in hand, the soil scientist made a reconnaissance study of the survey area. At this time, the delineations on the schematic map were checked for accuracy of content and location. The aerial photos were studied stereoscopically and the photo images were compared to the conditions found on the ground to insure that later recognition by photo innterpretation would be credible. Lithologic, geomorphic, soil, and vegetative characteristics were recognized and recorded in field notes, on the schematic map, and on the aerial photo field sheets.

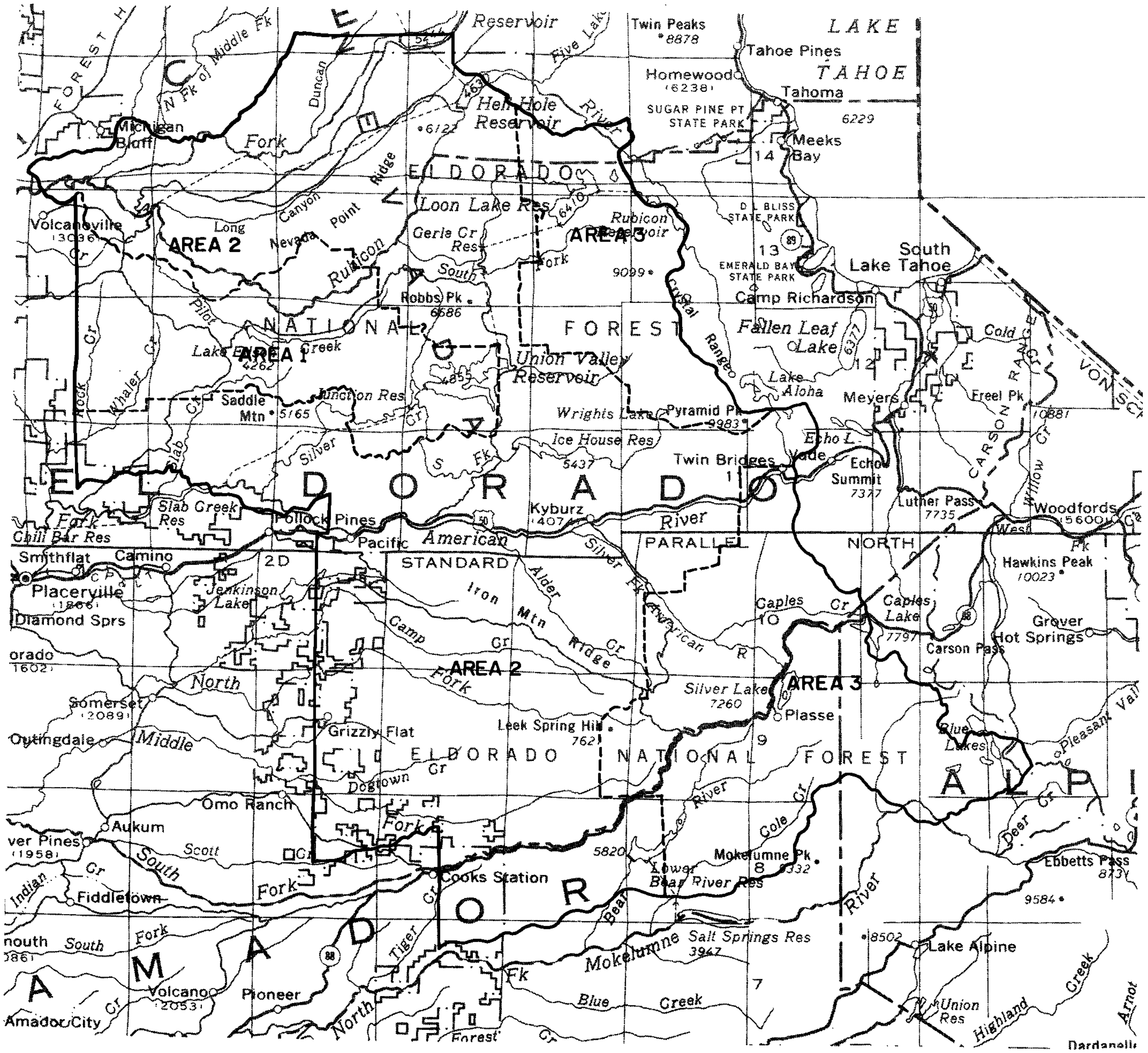
Using the augmented and corrected schematic map, field notes, and an understanding of how the photo images related to actual conditions on the ground, the soil scientist delineated map units on the aerial photographs. The map units corresponded to segments of the landscape having similar landform, vegetative cover, and soils as determined by a knowledge of ground conditions and by stereoscopic aerial photo interpretation. These aerial photos with the delineated map units and delineation symbols became the exploratory or preliminary soils map.

With the aerial photos (exploratory soils maps) and a field stereoscope in hand, the soil scientist examined on the ground as many delineations of each map unit as was possible, considering the access and time allowed to complete the survey. In this way, each different map unit was examined, studied, and described by aerial photo interpretation and on-the-ground investigation. However, in this survey area three levels of survey intensity (Orders 2, 3, 4) were used. The intensity of mapping within each of these Orders is mainly related to the degree of the on-the-ground investigation. Figure 4 shows the areas that were mapped at the different intensity levels.

In area 1 the California Department of Forestry's Soil-Vegetation Survey mapped to an Order 2 intensity level. In this area every delineation of each different map unit was visited and examined on the ground. As each map unit was visited and examined, individual soils were recognized, studied, described, classified, and enough data was collected to furnish the information needed to make interpretations and predictions concerning the use and management of each soil. The map units usually contain soils that are inseparable on a particular portion of the landscape. These areas were mapped as soil complexs. In some areas map units with individual soils were also delinated. *Maps made at this intensity level are suitable for project planning. Only minimal additional field verification may be necessary.*

In area 2 the Forest Service mapped to an Order 3 intensity level. In this area every delineation of each different map unit was not visited and examined on the ground. Those delineations with no easy access were rarely visited, but were mappped by aerial photo interpretation. Therefore, possibly one-third to one-half of the delineations on the field sheets and maps were not entered and examined by an on-the-ground investigation. *This is one of the main aspects of this survey that limits its reliability.* It is one reason that the survey is not suitable for project planning without field verification.

As each map unit was visited and examined, individual soils were recognized, studied, described, classified, and enough data was collected to furnish the information needed to make interpretations and predictions concerning the use and management of each soil. *However, the exact location of each soil was not delineated.* The map units usually consist of a group of soils that occupy a particular portion of the landscape which was delineated on the aerial photo field sheets. Depending on the area location, arrangement and extent of the individual soils that are components of the delineated map unit, a map unit is called an association or complex of soil components. The soil scientist made a field and aerial photo examination to estimate the soil component percentage composition for each map unit. These map units *do not* necessarily consist of similar soils. They consist of geographically associated soils that may be, and usually are, quite different in their characteristics and their suitability for use and management. *These are other aspects of the survey that limit its reliability and make it not suitable for project planning without field verification.*



Mapping Unit Areas within the Eldorado National Forest Soil Survey Area

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In area 3 the Forest Service mapped to an Order 4 intensity level. In this area representative delineations of each map unit were identified by photo interpretation and their patterns and composition determined by transects. Subsequent delineations were mapped mostly by interpretation of remotely sensed data verified by an occasional observation and traverse. Boundaries were then plotted by air photo interpretation. As each representative map unit was visited and examined, enough data was collected to identify groups of soils that have similar types and arrangement of diagnostic horizons. Individual soils were not identified. The map units usually consisted of these individual groups of soil or an association of these groups. The soil scientist made a field examination of the representative delineations and used aerial photo interpretation to estimate the percentage composition for each map unit. These map units do not necessarily consists of similar soils. They consist of geographically associated soils that may be, and usually are quite different in their characteristics and their suitability for use and management. *Soil maps made at this intensity level are not suitable for project planning and should only be used for broad multicounty, regional, or state wide planning efforts.*

The photo base used during field mapping in Area 1 was at a scale of 1:24,000. The photo base used during field mapping in Area 2 and Area 3 was at a scale of 1:15,840. The maps published with this report are at a scale of 1:63,360. In addition, Soil-Vegetation maps at a scale of 1:24,000 are available from the California Department of Forestry for Area 1. Soil maps for Areas 2 and 3 are also available at 1:24,000 from the Forest Service.

The interpretations and predictions concerning use and management found in this report are based on the soil scientist's knowledge and understanding of the conditions recognized and measured in the time allotted to this inventory. By classifying the soils, the soil scientist can also bring information concerning use and management of a particular soil from other survey areas where this same soil occurs and has been recognized and studied. Because of the different survey intensity levels use to complete this survey, the use and management interpretations and predictions should be considered based on the amount of examinations and measurement that were made.

General Soils Map

The general soil map shows map units which consist of many individual soils. A map unit typically is made up of one or more soils of major extent and several soils of minor extent. Map units are named for the major soils occurring in the unit. The soils in one unit can occur in other units. The soils are classified at the series level or at a higher taxonomic level.

The map furnishes a broad perspective of the soils in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. General areas which are capable of timber production or range production can be identified on the map. Likewise, general areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of the generalization of map units and the small scale of the map, the location of specific soils are not shown. The map and map unit information is not suitable for Forest or project level land management planning. It gives a very general overview of soil conditions and is only suitable for State or Regional planning.

There are three soil temperature zones in the survey area; (1) Mesic, (2) Frigid, and (3) Cryic. Soils within these zones have been grouped principally on the basis of soil differences that are related to differences in parent rock.

Soils of the Mesic Zone

The mesic soil temperature zone is located in the western part of the soil survey area. In this zone the topography consists of tabular ridges and mountainsides that are deeply entrenched by rivers and streams that flow westward. Elevations range from 2,000 feet to 8,500 feet. Annual precipitation ranges from 40 inches to more than 60 inches, and much of it falls as snow. The soil ranges from less than 10 inches to more than 60 inches deep to bedrock. Rock outcrop is common. The mesic zone makes up 53 percent of the survey area.

There are six map units in the mesic zone. The soils in these map units formed in material weathered from slates and schists, volcanic lahars, and granitic rocks. The plant cover is dominantly forest of conifers and hardwoods, and there are scattered areas of brush.

1. Cohasset-McCarthy-Crozier

Moderately deep, deep, and very deep soils that are well drained; formed in material weathered from andesitic lahar.

This map unit occurs on mountainsides and the tops and shoulders of tabular ridges. Slope is 2 to 75 percent. The vegetation is typically dense stands of the Mixed Conifer-Pine and Mixed Conifer-Fir series. Elevation is 2,000 to 6,000 feet. Average annual precipitation is 40 to 60 inches or more at the higher elevations, much of which falls as snow.

This unit makes up about 8 percent of the survey area. It is about 45 percent Cohasset soils, 25 percent McCarthy soils, and 15 percent Crozier soils. The remaining 15 percent consist of minor components.

The Cohasset soils have a surface layer of brown loam and a subsoil of strong brown gravelly clay loam. The depth to the weathered andesitic lahar ranges from 40 to 80 inches. These soils are well drained.

The McCarthy soils have a surface layer of brown gravelly sandy loam and a subsoil of brown very gravelly loam. The depth to the slightly weathered andesitic lahar ranges from 20 to 40 inches. These soils are well drained.

The Crozier soils have a surface layer of dark brown loam and a subsoil of yellowish red cobbly loam. The depth to slightly weathered andesitic lahar ranges from 20 to 40 inches. These soils are well drained.

Minor components in this unit are the very deep Aiken soils and the shallow Ledmount soils.

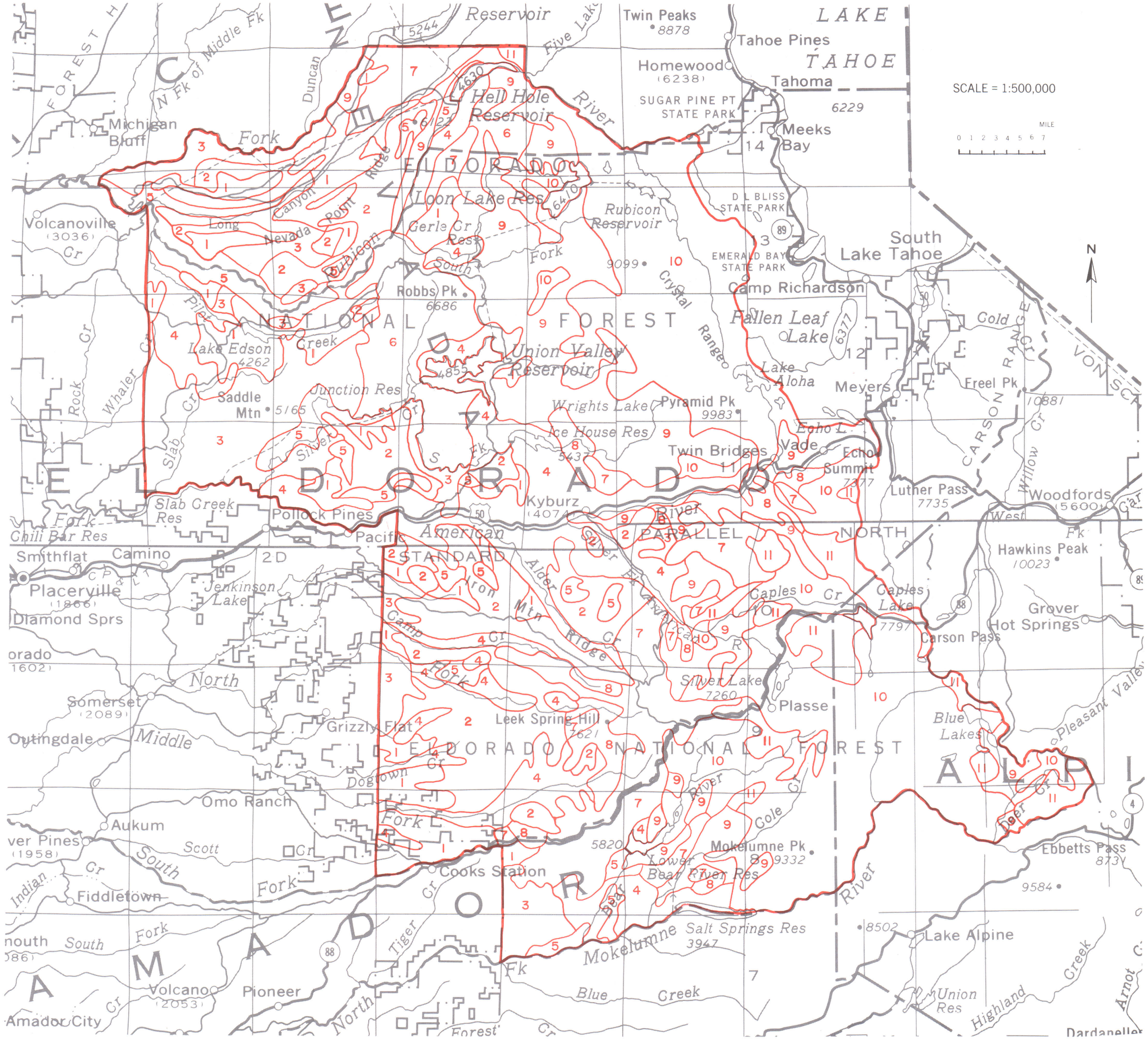
This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas, maintaining the soil depth of the McCarthy and Crozier soils, and the low subsoil strength of the Cohasset soils.

2. McCarthy-Ledmount

Shallow and moderately deep soils that are well drained and somewhat excessively drained; formed in material weathered from andesitic lahar.

This map unit is in the western half of the survey area at elevations of 2,000 feet to 6,000 feet. These soils are on mountainsides and the tops, and sides of volcanic tabular ridges. Slopes are 2 to 75 percent. The vegetation is typically the Mixed Conifer-Pine series on the McCarthy soils and the Greenleaf Manzanita series on the Ledmount soils. Average annual precipitation is 40 to 60 inches or more at the higher elevations, much of which falls as snow.

GENERAL SOIL MAP
ELDORADO NATIONAL FOREST AREA



LEGEND
General Soils Map
Eldorado National Forest Area, California
Parts of Alpine, Amador, El Dorado and Placer Counties

MESIC ZONE

1 Cohasset-McCarthy-Crozier: Moderately deep, deep, and very deep soils that are well drained; formed in material weathered from andesitic lahar.

2 McCarthy-Ledmount: Shallow and moderately deep soils that are well drained and somewhat excessively drained; formed in material weathered from andesitic lahar.

3 Jocal-Mariposa: Moderately deep, deep, and very deep soils that are well drained; formed in material weathered from metasedimentary rock.

4 Chaix-Pilliken-Holland: Moderately deep, deep, and very deep soils that are well drained and somewhat excessively drained; formed in material weathered from granitic rock.

5 Rock outcrop-Maymen-Lithic Xerumbrepts: Shallow soils that are somewhat excessively drained and excessively drained; formed in material weathered from metasedimentary, andesitic lahar, and granitic rock.

6 Hartless-Neuns-Mieruf: Moderately deep, deep, and very deep soils that are well drained; formed in material weathered from metasedimentary rock.

FRIGID ZONE

7 Waca-Windy: Moderately deep, deep, and very deep soils that are well drained; formed in material weathered from andesitic lahar.

8 Ledford-Notned-Lumberly: Moderately deep, deep, and very deep soils that are somewhat excessively drained and well drained; formed in material weathered from granitic rock, colluvium, and glacial material composed primarily granitic rock.

9 Tallac-Gerle-Xerumbrepts: Moderately deep, deep, and very deep soils that are moderately well drained and well drained; formed in material weathered from alluvium, glacial till, and outwash.

CRYIC ZONE

10 Rock Outcrop-Cryumbrepts: Glaciated rock outcrop and moderately deep, deep, and very deep soils that are well drained to poorly drained; formed in material weathered from alluvium, glacial till and outwash, and granitic rock.

11 Lithic Cryumbrepts-Andic Cryumbrepts: Shallow, moderately deep, and deep soils that are excessively drained and well drained; formed in material weathered from andesitic lahar.

This unit makes up about 13 percent of the survey area. It is about 75 percent McCarthy soils, and 15 percent Ledmount soils. The remaining 10 percent consist of minor components.

The McCarthy soils have a surface layer of brown gravelly sandy loam and a subsoil of brown very gravelly loam. The depth to the slightly weathered andesitic lahar ranges from 20 to 40 inches. These soils are well drained.

The Ledmount soils have a surface layer of dark grayish brown cobbly sandy loam. The depth to slightly fractured andesitic lahar ranges from 10 to 20 inches. These soils are well drained or somewhat excessively drained.

Minor components include Rock outcrop, the deep or very deep Cohasset soils and the moderately deep Crozier soils

This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas and maintaining the soil depth.

3. Jocal-Mariposa

Moderately deep, deep and very deep soils that are well drained; formed in material weathered from metasedimentary rock.

This map unit is in the western portion of the survey area at elevations of 2,000 to 6,500 feet. These soils are on ridgetops and mountainsides. Slopes are 5 to 75 percent. The Mixed Conifer-Pine series is the dominant vegetation. The Maple-Alder-Dogwood series is along some of the major drainages. Average annual precipitation is 40 to 60 inches, much of which falls as snow.

This map unit makes up about 8 percent of the survey area. It is about 70 percent Jocal soils and 20 percent Mariposa soils. The remaining 10 percent consist of minor components.

The Jocal soils have a surface layer of brown loam and a subsoil of reddish yellow silty clay loam. The depth to weathered metasedimentary bedrock ranges from 60 inches or more. These soils are well drained.

The Mariposa soils have a surface layer of strong brown gravelly silt loam and a subsoil of reddish yellow gravelly silty clay loam. The depth to partly fractured and uptilted metasedimentary bedrock ranges from 10 to 35 inches. These soils are well drained.

Minor components include Rock outcrop and the very deep Sites soils.

This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas and the maintaining the soil depth on the Mariposa soils.

4. Chaix-Pilliken-Holland

Moderately deep, deep, and very deep soils that are well drained and somewhat excessively drained; formed in material weathered from granitic rock.

This map unit is along the major drainages in the western portion of the survey area at elevations of 2,500 to 6,000 feet. These soils are on mountainsides. Slopes are 5 to 75 percent. The Mixed Conifer-Pine series is the dominant vegetation. Average annual precipitation is 40 to 65 inches, much of which falls as snow.

This unit makes up about 12 percent of the survey area. It is about 40 percent Chaix soils, 25 percent Pilliken soils, and 15 percent Holland soils. The remaining 20 percent consist of minor components.

The Chaix soils have a surface layer of grayish brown coarse sandy loam and a subsoil of light yellowish brown coarse sandy loam. The depth to weathered granitic rock ranges from 20 to 40 inches. These soils are well drained.

The Pilliken soils have a surface layer of dark grayish brown coarse sandy loam and a subsoil of very pale brown gravelly coarse sandy loam. The depth to highly weathered granitic rock is 40 to 60 inches. These soils are well drained.

The Holland soils have a surface layer of brown loam and a subsoil of reddish yellow sandy clay loam. The depth to weathered granitic rock is 60 inches or more. These soils are on slopes ranging from 5 to 75 percent slopes and are well drained.

Minor components include Rock outcrop, the moderately deep Bighill soils and the very deep Musick soils.

This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas, maintaining the soil depth, low available water capacity of the Chaix soils, and the low subsoil strength of the Holland soils.

5. Rock Outcrop-Maymen-Lithic Xerumbrepts

Shallow soils that are somewhat excessively drained and excessively drained; formed in material weathered from metasedimentary, andesitic lahar, and granitic rock.

This map unit is in the western portion of the survey area and is mainly associated with the steep river cayons, backslopes, and mountainsides at elevations of 2,400 to 8,500 feet. Slopes are 2 to 100 percent. CALVEG series on this unit are the Canyon Live Oak series, Mountain Whitethorn series, and the Huckleberry Oak series. Average annual precipitation is 45 to 70 inches, much of which falls as snow.

This unit makes up about 7 percent of the survey area. It is about 30 percent Rock outcrop, 20 percent Maymen soils and 15 percent Lithic Xerumbrepts. The remaining 35 percent consist of minor components.

Rock outcrop occurs as small isolated outcroppings and as massive exposures.

The Maymen soils have a surface layer of pale brown gravelly loam and a subsoil of light brown gravelly loam. Depth to partly fractured and uptilted metamorphic rock is 10 to 20 inches. These soils are on backslopes and mountainsides with slopes ranging from 2 to 100 percent and are somewhat excessively drained.

Lithic Xerumbrepts soils have a dark surface layer and coarse textures. Depth to hard rock is 10 to 20 inches. These soils are on mountainsides with slopes ranging from 15 to 100 percent and are somewhat excessively drained or excessively drained.

Minor components include the shallow excessively drained Ledmount soils and the moderately deep Mariposa soils.

This unit is use mainly for wildlife habitat and limited summer range.
The main concerns for management on this unit include the potential erosion hazard of runoff from these areas on to adjacent disturbed areas and maintaining the soil depth of the Maymen soils and Lithic Xerumbrepts.

6. Hartless-Neuns-Mieruf

Moderately deep, deep, and very deep soils that are well drained; formed in material weathered from metasedimentary rock.

This map unit occurs on ridgetops, mountainsides and canyons at elevations of 2,400 to 7,900 feet. Slopes are 5 to 100 percent. The Mixed Conifer-Pine series is the dominant vegetation, but the Mountain Whitethorn series is found within the unit. Average annual precipitation is 50 to 65 inches, much of which falls as snow.

This unit makes up about 5 percent of the survey area. It is about 35 percent Hartless soils, 20 percent Neuns soils, and 10 percent Mieruf soils. The remaining 35 percent consist of minor components.

The Hartless soils have a surface layer of very dark grayish brown very gravelly loam and a subsoil of strong brown very gravelly fine sandy loam. The depth to weathered metasedimentary bedrock ranges from 40 to 60 inches or more. These soils are on slopes ranging from 5 to 75 percent and are well drained.

The Neuns soils have a surface layer of yellowish brown gravelly loam and a subsoil of reddish yellow very cobbly sandy loam. The depth to hard fractured metasedimentary bedrock ranges from 20 to 40 inches. These soils are on slopes ranging from 15 to 100 percent and are well drained.

The Mieruf soils have a surface layer of dark brown very gravelly loam and a subsoil reddish yellow gravelly loam. The depth to weathered fractured metasedimentary rock is 40 to 60 inches. These soils are on slopes ranging from 5 to 75 percent and are well drained.

Minor components include the deep and moderately deep Hangtown and Smokey soils at higher elevations (5,800 to 7,900 feet), and the shallow, somewhat excessively drained or excessively drained Lithic Xerumbrepts.

This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas, maintaining the soil depth of the Neuns soils, and the low available water capacity of the Nuens and Hartless soils.

Soils of the Frigid Zone

The frigid soil temperature zone is at elevations of 5,400 to 10,000 feet. In this zone the topography is highly variable, consisting of glacial deposits, granitic mountainsides and volcanic mountainsides. Annual precipitatiion ranges from 55 to 70 inches, most of which fall as snow. The soils range from less than 10 inches to more than 60 inches deep. Rock outcrop is common throughout this zone. The plant cover is dominantly forests of red and white fir with numerous wet areas.

The frigid zone makes up 19 percent of the survey area. Three map units makeup this zone.

7. Waca-Windy

Moderately deep, deep, and very deep soils that are well drained; formed in material weathered from andesitic lahar.

This map unit occurs on mountainsides at elevations of 6,000 feet to 10,000 feet. Slopes are 5 to 50 percent. The Red Fir series is the dominant vegetation. Average annual precipitation is 45 to 80 inches, most of which falls as snow.

This unit makes up about 5 percent of the survey area. It is about 65 percent Waca soils, and 25 percent Windy soils. The remaining 10 percent consist of minor components.

The Waca soils have a surface layer of dark grayish brown cobbly sandy loam and a subsoil of brown very cobbly sandy loam. The depth to the weathered andesitic lahar ranges from 20 to 40 inches. These soils are well drained.

The Windy soils have a surface layer of yellowish brown gravelly sandy loam and a subsoil of light yellowish brown extremely cobbly sandy loam. The depth to weathered andesitic lahar ranges from 40 to 60 inches or more. These soils are well drained.

Minor components include the shallow excessively drained Lithic Cyrumbrepts and the somewhat poorly drained or poorly drained Cryumbrepts along drainages.

This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas and maintaining the soil depth of the Waca soils.

8. Ledford-Notned-Lumberly

Moderately deep, deep, and very deep soils that are somewhat excessively drained and well drained; formed in material weathered from granitic rock, colluvium and glacial material composed primarily of granitic rock.

This map unit occurs on glacial moraines and outwash, and mountainsides at elevations of 5,600 feet to 8,500 feet. Slopes are 2 to 50 percent. The Red Fir and Mixed Conifer-Fir series are the dominant vegetation. Average annual precipitation is 55 to 70 inches, most of which falls as snow.

This unit makes up about 5 percent of the survey area. It is about 45 percent Ledford soils, 25 percent Notned soils, and 20 percent Lumberly soils. The remaining 10 percent consist of minor components.

The Ledford soils have a surface layer of dark brown sandy loam and a subsoil of yellowish brown coarse sandy loam. The depth to highly weathered granitic rock ranges from 40 to 60 inches. These soils are somewhat excessively drained.

The Notned soils have a surface layer of dark brown bouldery coarse sandy loam and a subsoil of brown very cobbly coarse sandy loam. The soil is 60 inches or more deep. These soils are well drained.

The Lumberly soils have a surface layer of grayish brown gravelly coarse sandy loam and a subsoil of light brown gravelly coarse sandy loam. The depth to weathered granitic rock ranges from 20 to 40 inches. These soils are well drained.

Minor components include Rock outcrop and the shallow, somewhat excesively drained or excessively drained Lithic Xerumbrepts.

This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the high hazard of erosion on disturbed areas, and maintaining the soil depth on the Lumberly soils.

9. Tallac-Gerle-Xerumbrepts

Moderately deep, deep, and very deep soils that are moderately well drained and well drained; formed in material weathered from alluvium, glacial till, and outwash.

This map unit occurs on moraines and outwash plains at elevations of 5,400 to 9,000 feet. Slopes are 2 to 75 percent. The Red Fir series is the dominant vegetation on the unit, but areas of Mixed Conifer-Fir series and the Huckleberry Oak series are found throughout the unit. Average annual precipitation is 50 to 70 inches, most of which falls as snow.

This unit makes up about 9 percent of the survey area. It is about 32 percent Tallac soils, 19 percent Gerle soils, and 13 percent Xerumbrepts. The remaining 36 percent consist of minor components.

The Tallac soils have a surface layer of very dark grayish brown very cobbly sandy loam and a subsoil of yellowish brown very gravelly sandy loam. The soil is 40 to 60 inches deep or more. These soils are on lateral and terminal moraines and glacial outwash on slopes ranging from 2 to 75 percent and are moderately well drained.

The Gerle soils have a surface layer of dark brown sandy loam and a subsoil of yellowish brown sandy loam. The soil is 60 inches or more deep. These soils are on ground moraines and outwash plains on slopes ranging from 2 to 50 percent and are well drained.

Xerumbrepts are moderately deep or deep, moderately well drained or well drained soils formed in glacially deposited material. Typically they have dark surface layers and sandy or loamy textures throughout the profile. Rock fragment content in the profile is highly variable. In some areas the surface layer is stony or bouldery.

Minor components include the moderately deep, moderately well drained or well drained Tinker soils, the very deep well drained Notned soils, the somewhat poorly drained or poorly drained Cryumbrepts along drainages, the poorly drained or very poorly drained Aquepts, the somewhat poorly drained or moderately well drained Umbrepts, and the deep or very deep, well drained Zeibright soils at the lower elevations.

This unit is used mainly for timber production. It is also used for summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas and the high amounts of rock fragments in the soil profile.

Soils of the Cryic Zone

The cryic soil temperature zone is found at elevations of 6,000 to 10,000 feet. This crest zone is characterized by glaciated terrain consisting of jagged peaks, numerous lakes, and U-shaped valleys with steep walls and flat floors. Annual precipitatiion ranges from 55 to 70 inches, most of which fall as snow. The soils range from less than 10 inches to more than 60 inches deep. Rock outcrop is common throughout this zone. This area is dominantly barren with pockets of lodgepole pine, red fir, and hemlock forest and numerous wet areas.

The cryic zone makes up 28 percent of the survey area. Two map units makeup this zone.

10. Rock Outcrop-Cryumbrepts

Glaciated rock outcrop and moderately deep, deep, and very deep soils that are well drained to poorly drained; formed in material weathered from alluvium, glacial till and outwash, and granitic rock.

This map unit occurs on the eastern side of the survey area at elevations of 6,500 to 9,500 feet and is mainly associated with moraines, terraces and alluvial fans in the glaciated Wilderness areas. Slopes are 2 to 75 percent. The Red Fir series is the dominate vegetation on the unit, but the Lodgepole Pine series, the Sedge-Rush series, Willow series, and the Alder series are also found throughout the unit. Average annual precipitation is 45 to 70 inches, most of which falls as snow.

This unit makes up about 23 percent of the survey area. It is about 80 percent Rock outcrop and 10 percent Cryumbrept soils. The remaining 10 percent consist of minor components.

Glaciated rock outcrop consists of granitic, basic igneous, undifferentiated metamorphic, metasedimentary and metavolcanic rock types.

Cryumbrepts are moderately deep, deep or very deep, well drained to poorly drained soils formed in glacial outwash or alluvium. Typically they have dark surfaces and sandy or loamy textures throughout the profile. Rock fragment content in the profile is highly variable. Poorly drained areas occur along drainways and in basins. In some areas the surface layer is stony or bouldery.

Minor components include the shallow and moderately deep Orthents and 2he poorly or very poorly drained Aquepts and Umbrepts.

This unit is used mainly for recreation and summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas and disturbance of the poorly drained soil areas.

11. Lithic Cryumbrepts-Andic Cryumbrepts

Shallow, moderately deep, and deep soils that are excessively drained and well drained; formed in material weathered from andesitic lahar.

This map unit occurs on the eastern side of the survey area at elevations of 6,000 to 10,000 feet and is mainly associated with ridgetops and mountainsides along the crest of the Sierra Nevada in the Wilderness areas. Slopes are 5 to 75 percent. The Mule Ears series dominate vegetation on the ridgetops but Mountain Hemlock and Red Fir series occur in pockets on the mountainsides. Areas of the Mountain Whitethorn, Lodgepole Pine and the Alder series are also found throughout the unit. Average annual precipitation is 45 to 70 inches, most of which falls as snow.

This unit makes up about 5 percent of the survey area. It is 70 percent Lithic Cryumbrepts and 20 percent Andic Cryumbrepts. The remaining 10 percent consist of minor components.

Lithic Cryumbrepts are shallow, excessively drained and formed in material weathered from andesitic lahar. They are loamy and have a highly variable rock fragment content. Typically the surface horizons are dark.

Andic Cryumbrepts are moderately deep or deep, well drained soils formed in material weathered from andesitic lahar. Typically they have dark surface horizons with loamy textures and highly variable rock fragment content throughout the profile.

Minor components include Rock outcrop and the moderately deep or deep, poorly drained to well drained Cryumbrepts.

This unit is used mainly for recreation and summer range. The main concerns for management on this unit include the hazard of erosion on disturbed areas and the disturbance of the poorly drained soil areas.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils and miscellaneous areas have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavior divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Zeibright extremely gravelly coarse sandy loam is one of several phases in the Zeibright series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Aiken- Cohasset loams, 2 to 30 percent slopes is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Cohasset-McCarthy association, 2 to 30 percent slopes is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be

made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Aquepts and Umbrepts, 0 to 15 percent slopes is an undifferentiated group in this survey area.

This survey includes miscellaneous areas. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

This survey was mapped at three levels of detail. At the most detailed level, map units are narrowly defined. This means that map unit boundaries were plotted and verified at closely spaced intervals. At the less detailed level, map units are broadly defined. Boundaries were plotted and verified at wider intervals.

Table 1 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Table 1 Acreage and Proportionate Extent of the Map Units

Map Symbol	Map Unit Name	Acres	Percent of Survey Area
101	Aiken-Cohasset loams, 2 to 30 percent slopes	1,060	0.2
102	Andic Cryumbrepts-Lithic Cryumbrepts association, 15 to 50 percent slopes	8,232	1.2
103	Aquepts and Umbrepts, 0 to 15 percent slopes	4,877	0.7
104	Bighill-Musick complex, 50 to 75 percent slopes	415	0.1
105	Bighill-Rock outcrop-Dome complex, 5 to 30 percent slopes	219	0.1
106	Chaix coarse sandy loam, 30 to 75 percent slopes	13,892	2.0
107	Chaix-Pilliken coarse sandy loams, 5 to 30 percent slopes	16,952	2.5
108	Chaix-Pilliken coarse sandy loams, 30 to 75 percent slopes	15,894	2.3
109	Chaix-Rock outcrop complex, 30 to 75 percent slopes	6,950	1.0
110	Cohasset loam, 2 to 30 percent slopes	9,439	1.4
111	Cohasset-Hartless Variant complex, 2 to 30 percent slopes	580	0.1
112	Cohasset-McCarthy association, 2 to 30 percent slopes	11,862	1.7
113	Cohasset-McCarthy association, 30 to 50 percent slopes	8,272	1.2
114	Cohasset-McCarthy association, rhyolitic substratum, 5 to 30 percent slopes	3,140	0.4
115	Cohasset-McCarthy association, rhyolitic substratum, 30 to 75 percent slopes	7,721	1.1
116	Crozier-Cohasset loams, 5 to 30 percent slopes	3,120	0.5
117	Crozier-Cohasset loams, 30 to 50 percent slopes	289	0.1
118	Crozier-McCarthy complex, 5 to 30 percent slopes	5,458	0.8
119	Crozier-McCarthy complex, 30 to 50 percent slopes	3,879	0.6
120	Cryumbrepts association, 5 to 50 percent slopes	12,572	1.8

Table 1 Acreage and Proportionate Extent of the Map Units, continued			
Map Symbol	Map Unit Name	Acres	Percent of Survey Area
121	Dome coarse sandy loam, 2 to 30 percent slopes	690	0.1
122	Dome-Zeibright complex, 2 to 30 percent slopes	1,724	0.3
123	Dome-Zeibright complex, 30 to 50 percent slopes	278	0.1
124	Dome Variant coarse sandy loam, 0 to 10 percent slopes	342	0.1
125	Fluvents, 0 to 10 percent slopes	302	0.1
126	Gerle coarse sandy loam, 2 to 30 percent slopes	571	0.1
127	Gerle-Notned complex, 2 to 30 percent slopes	7,564	1.1
128	Gerle-Tallac complex, 5 to 30 percent slopes	10,502	1.5
129	Gerle-Tallac complex, 30 to 50 percent slopes	1,786	0.2
130	Gerle-Umbrepts association, 2 to 15 percent slopes	2,245	0.3
131	Hangtown-Lithic Xerumbrepts complex, 15 to 50 percent slopes	3,433	0.5
132	Hangtown-Smokey complex, 5 to 30 percent slopes	710	0.1
133	Hangtown-Smokey complex, 30 to 50 percent slopes	687	0.1
134	Hartless very gravelly loam, 5 to 30 percent slopes	1,332	0.2
135	Hartless very gravelly loam, 30 to 50 percent slopes	2,966	0.4
136	Hartless-Mieruf very gravelly loams, 5 to 30 percent slopes	1,677	0.2
137	Hartless-Mieruf very gravelly loams, 30 to 50 percent slopes	1,225	0.2
138	Hartless-Mieruf very gravelly loams, 50 to 75 percent slopes	610	0.1
139	Hartless-Neuns complex, 15 to 30 percent slopes	1,011	0.2
140	Hartless-Neuns complex, 30 to 75 percent slopes	3,509	0.5
141	Hartless Variant very gravelly sandy loam, 30 to 50 percent slopes	260	0.1
142	Holland loam, 5 to 30 percent slopes	2,752	0.4
143	Holland loam, 30 to 50 percent slopes	997	0.1

101 - Aiken-Cohasset loams, 2 to 30 percent slopes.

This map unit is on the tops and sides of volcanic tabular ridges. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 5,000 feet. The average annual precipitation is 50 to 60 inches.

This unit is 70 percent Aiken loam and 20 percent Cohasset loam. The percentage may vary from one area to another.

Included in this unit are small areas of Crozier and McCarthy soils. Also included in the Nevada Point Ridge area are small areas of slopes greater than 30 percent. Included areas make up about 10 percent of the total acreage.

The Aiken soil is very deep and well drained. It formed in material weathered from andesitic lahar. The surface layer is brown loam about 16 inches thick. The upper 20 inches of the subsoil is yellowish red clay loam. The lower 29 inches is yellowish red clay. The substratum material to a depth of 80 inches is strong brown clay loam.

Permeability of the Aiken soil is moderately slow. Available water capacity is high. Effective rooting depth is 65 to 120 inches. The maximum erosion hazard is moderate.

The Cohasset soil is deep or very deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown or dark brown loam about 19 inches thick. The upper 9 inches of the subsoil is strong brown gravelly clay loam. The lower 16 inches is yellowish red gravelly clay loam. Weathered andesitic lahar is at a depth of 44 inches. In some areas the surface layer is sandy loam or gravelly sandy loam.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 165 to over 225 cubic feet per acre for ponderosa pine and Douglas fir. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

102 - Andic Cryumbrepts-Lithic Cryumbrepts Association, 15 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on the Andic Cryumbrepts component of this unit. The Mule Ears series typically occurs on the Lithic Cryumbrepts component of this unit. Areas of the Lodgepole Pine, Mountain Hemlock, and Alder series are also found throughout the unit. Elevation is 7,000 to 10,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 60 percent Andic Cryumbrepts and 25 percent Lithic Cryumbrepts. The percentage may vary from one area to another.

Included in this unit are small areas of Cryumbrepts, wet, and Waca soils. The Cryumbrepts, wet soil is along tributary drainages which are vegetated with willows, mixed grasses, and forbs. Also included are small areas of rock outcrop. Included areas make up about 15 percent of the total acreage.

The Andic Cryumbrepts is moderately deep or deep and well drained. It is formed in material weathered from andesitic lahar. Typically, the surface layer is dark with low bulk density. It is sandy loam, coarse sandy loam, or loam throughout the profile, with coarse fragments ranging from 15 to 85 percent.

Permeability of the Andic Cryumbrepts is moderately rapid. Available water capacity is very low to low. The short growing season limits the productivity of these soils. Effective rooting depth is 20 to 60 inches. The maximum erosion hazard is high.

The Lithic Cryumbrepts is shallow and excessively drained. It formed in material weathered from andesitic lahar. Typically, it is sandy loam, fine sandy loam, or loam with coarse fragments ranging from 20 to 80 percent. The surface layer is dark, has low bulk density.

Permeability of the Lithic Cryumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. The maximum erosion hazard is very high.

This unit is used mainly for recreation in Wilderness Areas. It is also used as summer range.

The Andic Cryumbrepts is used mainly for recreation and summer range. The main management concerns for this soil are steep slopes and the hazard of erosion. This soil is not available for the production of timber because of its isolated location in or adjacent to Wilderness areas.

The Lithic Cryumbrepts is used mainly for recreation and summer range. The main management concerns for this soil are the steep slopes, the high runoff potential, and the hazard of erosion. This soil is not timbered and is not suited to the production of timber because of the shallow depth.

103 - Aquepts and Umbrepts, 0 to 15 percent slopes.

This map unit is on broad valley flats and along drainages and the periphery of these areas. The Sedge-Rush series typically occurs on this unit. Elevation is 4,000 to 8,500 feet. The average annual precipitation is 50 to 70 inches.

These soils have no regular pattern of occurrence. Every delineation has at least one of the components and may have both. These soils are combined because the use and management are the same.

Included in this unit are small areas of Cryumbrepts, Dome, Dome Variant, Holland, Jocal, Pilliken, Tallac, Tinker, and Zeibright soils. Also included are small areas of a soil that are less than 20 inches deep to hard rock. Included areas make up about 10 percent of the total acreage.

The Aquepts is a very poorly drained or poorly drained soil that formed in alluvial material. Typically, it has dark surface layer and highly variable textures ranging from coarse textures to fine textures. The amount of gravel and cobbles is highly variable throughout the profile with some profiles having greater than 35 percent by volume.

Permeability of the Aquepts is very slow or slow. A reducing environment exists in these soils because the ground water table fluctuates to near the surface during the rainy season and during periods of high runoff. The maximum erosion hazard is low.

The Umbrepts is a somewhat poorly drained or moderately well drained soil that formed in alluvial material on the periphery of broad valley flats and drainages. Typically, it has a dark surface layer. The profile has stratified layers with textures ranging from clays to loams with 50 to 70 percent rock fragments.

Permeability of the Umbrepts is slow or moderately slow. The maximum erosion hazard is low.

This unit is used mainly for summer range.

This unit is well suited for intensive use as summer range. The main concerns in range management on this unit are seasonal flooding, a high seasonal water table and the stability of stream banks. Grazing should be delayed until the soil has drained and is firm enough to withstand trampling by livestock. Overuse can reduce sod type plant cover and cause gully erosion.

104 - Bighill-Musick complex, 50 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,600 to 4,000 feet. The average annual precipitation is 50 to 60 inches.

This unit is 50 percent Bighill coarse sandy loam and 25 percent Musick loam. The percentage may vary from one area to another.

Included in this unit are small areas of Chaix, Holland, Lithic Xerumbrepts, and Pilliken soils. Included areas make up about 25 percent of the total acreage.

The Bighill soil is moderately deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 5 inches of the surface layer is dark grayish brown coarse sandy loam. The lower 12 inches is brown gravelly sandy loam. The subsoil is brown cobbly sandy loam about 15 inches thick. Weathered granitic rock is at a depth of 32 inches.

Permeability of the Bighill soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The Musick soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 6 inches thick. The upper 18 inches of the subsoil is yellowish red clay loam. The lower 28 inches is red and yellowish red sandy clay loam. The upper 16 inches of the substratum is yellowish red gravelly sandy clay loam. The lower part to a depth of 71 inches is strong brown gravelly sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Musick soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for mixed conifers. The main concerns in producing and harvesting timber on this unit are the very steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. Cable yarding system are suited to this unit because they protect the surface soil from excessive disturbances. The use of ground base equipment for site preparation is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. This unit is suited to only limited use as summer range because of very steep slopes.

105 - Bighill-Rock outcrop-Dome complex, 5 to 30 percent slopes.

This map unit is on mountainsides. Slope is 2 to 30 percent. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 5,000 to 5,300 feet. The average annual precipitation is 55 to 65 inches.

This unit is 30 percent Bighill coarse sandy loam, 30 percent rock outcrop, and 25 percent Dome coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Lithic Xerumbrepts, Pilliken, and Zeibright soils. Included areas make up about 15 percent of the total acreage.

The Bighill soil is moderately deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 5 inches of the surface layer is dark grayish brown coarse sandy loam. The lower 12 inches is brown gravelly sandy loam. The subsoil is brown cobbly sandy loam about 15 inches thick. Weathered granitic rock is at a depth of 32 inches.

Permeability of the Bighill soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock. Runoff is very rapid. Large quanities of water may concentrate on soils downslope, which increases the hazard of erosion.

The Dome soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown coarse sandy loam about 7 inches thick. The subsoil is strong brown coarse sandy loam about 24 inches thick. The substratum to a depth of 60 inches or more is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is gravelly coarse sandy loam.

Permeability of the Dome soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth of 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

Much of this unit is poorly suited to the production of timber because of the areas of rock outcrop. The Bighill and Dome soils are suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for mixed conifer. The main concerns in producing and harvesting timber on this unit are the presence of Rock outcrop, maintaining soil depth, the low available water capacity, and the hazard of erosion. Potential surface runoff from Rock outcrop areas may require modification in skid trail layout, erosion control measures, and ground cover requirements to prevent erosion from concentrated flows. Rock outcrop on the surface hinders harvesting operations and can cause the breakage of timber when felled. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest slopes. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The production of forage is transitory and limited by the amount of competition from conifers.

106 - Chaix coarse sandy loam, 30 to 75 percent.

This moderately deep, somewhat excessively drained soil is on mountainsides. It formed in material weathered from granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 6,000 feet. The average annual precipitation is 40 to 55 inches.

Typically, the surface layer is grayish brown and brown coarse sandy loam about 5 inches thick. The upper 8 inches of the subsoil is light yellowish brown coarse sandy loam. The lower 17 inches is very pale brown coarse sandy loam. Weathered granitic rock is at a depth of 30 inches. In some areas the surface layer is sandy loam or fine sandy loam.

Included in this unit are small areas of Bighill, Holland, Lithic Xerumbrepts, Musick, and Pilliken soils. Also included are small areas of rock outcrop. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Chaix soil is moderately rapid. Available water apacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is very high.

This unit is used mainly for timber production. It is also used for summer range.

The Chaix soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the low available water capacity, the steep and very steep slopes and hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Steep yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. This soil is suited to only limited use as summer range because of steep and very steep slopes.

107 - Chaix-Pilliken coarse sandy loams, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 6,000 feet. The average annual precipitation is 45 to 55 inches.

This unit is 40 percent Chaix coarse sandy loam and 40 percent Pilliken coarse sandy loam. This percentage may vary from one area to another.

Included in this unit are small areas of Bighill, Holland, Ledford, and Lithic Xerumbrepts soils. Also included are small areas of rock outcrop. Included areas make up about 20 percent of the total acreage.

The Chaix soil is moderately deep and somewhat excessively drained. It formed in material weathered from granitic rock. Typically, the surface layer is grayish brown and brown coarse sandy loam about 5 inches thick. The upper 8 inches of the subsoil is light yellowish brown coarse sandy loam. The lower 17 inches is very pale brown coarse sandy loam. Weathered granitic rock is at a depth of 30 inches. In some areas the surface layer is sandy loam or fine sandy loam.

Permeability of the Chaix soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Pilliken soil is deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low available water capacity, maintaining the soil depth and hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The production of forage is transitory and limited by the amount of competition from conifers.

108 - Chaix-Pilliken coarse sandy loams, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 6,000 feet. The average annual precipitation is 45 to 55 inches.

This unit is 55 percent Chaix coarse sandy loam and 25 percent Pilliken coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Bighill, Holland, Ledford, and Lithic Xerumbrepts. Also included are small areas of Rock outcrop. Included areas make up about 20 percent of the total acreage.

The Chaix soil is moderately deep and somewhat excessively drained. It formed in material weathered from granitic rock. Typically, the surface layer is grayish brown and brown coarse sandy loam about 5 inches thick. The upper 8 inches of the subsoil is light yellowish brown coarse sandy loam. The lower 17 inches is very pale brown coarse sandy loam. Weathered granitic rock is at a depth of 30 inches. In some areas the surface layer is sandy loam or fine sandy loam.

Permeability of the Chaix soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The Pilliken soil is deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low avialable water capacity, the steep and very steep slopes, hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. This unit is suited to only limited use as summer range because of steep and very steep slopes.

109 - Chaix-Rock outcrop complex, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 6,000 feet. The average annual precipitation is 45 to 55 inches.

This unit is 40 percent Chaix coarse sandy loam and 40 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Bighill, Holland, Lithic Xerumbrepts, Musick, and Pilliken soils. Included areas make up about 20 percent of the total acreage.

The Chaix soil is moderately deep and somewhat excessively drained. It formed in material weathered from granitic rock. Typically, the surface layer is grayish brown and brown coarse sandy loam about 5 inches thick. The upper 8 inches of the subsoil is light yellowish brown coarse sandy loam. The lower 17 inches is very pale brown coarse sandy loam. Weathered granitic rocks is at a depth of 30 inches. In some areas the surface layer is sandy loam or fine sandy loam.

Permeability of the Chaix soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is very high.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic rock. Runoff is very rapid. Large quanities of water may concentrate on soils downslope, which increases the hazard of erosion.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used for limited timber production. It is also used as limited summer range.

Much of this unit is poorly suited to the production of timber because of the areas of rock outcrop. The Chaix soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the presence of Rock outcrop, the low available water capacity, the steep and very steep slopes and hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Potential surface runoff from Rock outcrop areas may require modification in skid trail layout, erosion control measures, and ground cover requirements to prevent erosion from concentrated flows. Cable yarding systems are suited to this unit because they protect the surface soil from excessive disturbances. Rock outcrop on the surface hinders harvesting operations and can cause breakage of timber when felled. The use of ground base equipment for site prepartion is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. This unit is suited to only limited use as summer range because of steep and very steep slopes.

110 - Cohasset loam, 2 to 30 percent slopes.

This deep or very deep and well drained soil is on the tops and sides of volcanic tabular ridges. It formed in material weathered from andesitic lahar. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,800 to 4,400 feet. The average annual precipitation is 50 to 60 inches.

Typically, the surface layer is brown or dark brown loam about 19 inches thick. The upper 9 inches of the subsoil is strong brown gravelly clay loam. The lower 16 inches is yellowish red gravelly clay loam. Weathered andesitic lahar is at a depth of 44 inches. In some areas the surface layer is sandy loam or gravelly sandy loam.

Included in this unit are small areas of Aiken, Crozier, and McCarthy soils. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Cohasset soil is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 165 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

111 - Cohasset-Hartless Variant complex, 2 to 30 percent slopes.

This map unit is on the tops and sides of volcanic tabular ridges. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,200 to 5,500 feet. The average annual precipitation is 55 to 60 inches.

This unit is 45 percent Cohasset very gravelly loam and 30 percent Hartless Variant very gravelly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Ziebright soils. Also included are small areas of a soil similar to Cohasset that has greater than 35 percent rock fragments in the subsoil and a soil similar to Hartless Variant that has less than 35 percent rock fragments in the subsoil. In a few small areas the slope is greater than 30 percent. Included areas make up about 25 percent of the total acreage.

The Cohasset soil is very deep and well drained. It formed in material weathered from basaltic lahar. Typically, the surface layer is brown very gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam. The lower 41 inches is brown and reddish brown gravelly clay loam. The substratum to a depth of 61 inches or more is light reddish brown gravelly sandy loam. In some areas the surface layer is loam.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth 60 inches or more. The maximum erosion hazard is moderate.

The Hartless Variant soil is deep or very deep and well drained. It formed in material weathered from basaltic lahar. Typically, the surface layer is brown very gravelly sandy loam about 12 inches thick. The subsoil is light brown gravelly sandy loam about 9 inches thick. The upper 20 inches of the substratum is pale brown very cobbly sandy loam. The lower part, to a depth of greater than 60 inches, is pale brown loamy sand. In some areas the surface layer is gravelly, cobbly, or very cobbly sandy loam.

Permeability of the Hartless Variant soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The productiion of forage is transitory and limited by the amount of competition from conifers.

112 - Cohasset-McCarthy association, 2 to 30 percent slopes.

This map unit is on mountainsides. Slope is 2 to 30 percent. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 5,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 50 percent Cohasset loam and 35 percent McCarthy gravelly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Aiken, Crozier, and Ledmount soils and rock outcrop. Also included are small areas of a soil similar to McCarthy that has less than 35 percent rock fragments in the subsoil and a soil similar to McCarthy that is over 40 inches deep. Included areas make up about 15 percent of the total acreage.

The Cohasset soil is deep or very deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown or dark brown loam about 19 inches thick. The upper 9 inches of the subsoil is strong brown gravelly clay loam. The lower 16 inches is yellowish red gravelly clay loam. Weathered andesitic lahar is at a depth of 44 inches. In some areas the surface layer is sandy loam or gravelly sandy loam.
Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is moderate.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Cohasset soil is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 165 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

The McCarthy soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth and hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

113 - Cohasset-McCarthy association, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 5,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 45 percent Cohasset loam and 40 percent McCarthy gravelly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Crozier and Ledmount soils and rock outcrop. Also included are small areas of a soil similar to McCarthy that has less than 35 percent rock fragments in the subsoil and a soil similar to McCarthy that is over 40 inches deep. Included areas make up about 15 percent of the total acreage.

The Cohasset soil is deep or very deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown or dark brown loam about 19 inches thick. The upper 9 inches of the subsoil is strong brown gravelly clay loam. The lower 16 inches is yellowish red gravelly clay loam. Weathered andesitic lahar is at a depth of 44 inches. In some areas the surface layer is sandy loam or gravelly sandy loam.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is high.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Cohasset soil is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 165 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes, the hazard of erosion, and the low subsoil strength. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. This soil is suited to only limited use as summer range because of steep slopes.

The McCarthy soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimiing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. This soil is suited to only limited use as summer range because of steep slopes.

114 - Cohasset-McCarthy association, rhyolitic substatum, 5 to 30 percent slope.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 45 percent Cohasset gravelly sandy loam and 40 percent McCarthy gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Ledmount soils and rock outcrop. Also included are small areas of a soil similar to Cohasset that is less than 40 inches deep. Included areas make up about 15 percent of the total acreage.

The Cohasset soil is deep or very deep and well drained. It formed in material weathered from rhyolitic rock. Typically, the surface layer is dark grayish brown and brown gravelly sandy loam about 5 inches thick. The subsoil is very pale brown gravelly sandy clay loam about 43 inches thick. The substratum is very pale brown loam about 9 inches thick. Highly weathered rhyolitic rock is at a depth of 57 inches.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is moderate.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from rhyolitic rock. Typically, the surface layer is brown gravelly loam about 11 inches thick. The subsoil is brown very cobbly loam about 13 inches thick. Slightly weathered and fractured rhyolitic rock is at a depth of 24 inches.

Permeability of the McCarthy soil is moderately rapid. Available water holding capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Cohasset soil is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 165 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Following road construction or timber harvest activities, road failures and landslides may occur. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

The McCarthy soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the hazard of erosion and maintaining the soil depth. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. Following road construction or timber harvest activities, road failures and landslides may occur. The production of forage is transitory and limited by the amount of competition from conifers.

115 - Cohasset-McCarthy association, rhyolitic substatum, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 40 to 60 inches.

This unit is 40 percent Cohasset gravelly sandy loam and 40 percent McCarthy gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Ledmount soils and rock outcrop. Also included are small areas of a soil similar to Cohasset that is less than 40 inches deep. Included areas make up about 20 percent of the total acreage.

The Cohasset soil is deep or very deep and well drained. It formed in material weathered from rhyolitic rock. Typically, the surface layer is dark grayish brown and brown gravelly sandy loam about 5 inches thick. The subsoil is very pale brown gravelly sandy clay loam about 43 inches thick. The substratum is very pale brown loam about 9 inches thick. Highly weathered rhyolitic rock is at a depth of 57 inches.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is high.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from rhyolitic rock. Typically, the surface layer is brown gravelly loam about 11 inches thick. The subsoil is brown very cobbly loam about 13 inches thick. Slightly weathered and fractured rhyolitic rock is at a depth of 24 inches.

Permeability of the McCarthy soil is moderately rapid. Available water holding capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Cohasset soil is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 165 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Following road construction and timber harvest activities, road failures and landslides may occur. This soil is suited to only limited use as summer range because of steep and very steep slopes.

The McCarthy soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are steep and very steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Following road construction and timber harvest activities, road failures and landslides may occur. This soil is suited to only limited use as summer range because of steep and very steep slopes.

116 - Crozier-Cohasset loams, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 2,000 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 55 percent Crozier loam and 35 percent Cohasset loam. The percentage may vary from one area to another.

Included in this unit are small areas of Aiken, Ledmount, and McCarthy soils. Also included are small areas of a soil similar to Crozier that have a subsoil of sandy loam. Included areas make up about 10 percent of the total acreage.

The Crozier soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark brown loam about 6 inches thick. The upper 10 inches of the subsoil is strong brown loam. The lower 18 inches is yellowish red cobbly loam. Fractured and weathered andesitic lahar is at a depth of 34 inches.

Permeability of the Crozier soil is moderate. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Cohasset soil is deep or very deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown or dark brown loam about 19 inches thick. The upper 9 inches of the subsoil is strong brown gravelly clay loam. The lower 16 inches is yellowish red gravelly clay loam. Weathered andesitic lahar is at a depth of 44 inches. In some areas the surface layer is sandy loam or gravelly sandy loam.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength, maintaining the soil depth, and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The production of forage is transitory and limited by the amout of competition from to conifers.

117 - Crozier-Cohasset loams, 30-50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 2,000 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 60 percent Crozier loam and 30 percent Cohasset loam. The percentage may vary from one area to another.

Included in this unit are small areas of McCarthy and Ledmount soils. Also included are small areas of a soil similar to Crozier that have a subsoil of sandy loam. Included areas make up about 10 percent of the total acreage.

The Crozier soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark brown loam about 6 inches thick. The upper 10 inches of the subsoil is strong brown loam. The lower 18 inches is yellowish red cobbly loam. Fractured and weathered andesitic lahar is at a depth of 34 inches.

Permeability of the Crozier soil is moderate. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The Cohasset soil is deep or very deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown or dark brown loam about 19 inches thick. The upper 9 inches of the subsoil is strong brown gravelly clay loam. The lower 16 inches is yellowish red gravelly clay loam. Weathered andesitic lahar is at a depth of 44 inches. In some areas the surface layer is sandy loam or gravelly sandy loam.

Permeability of the Cohasset soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 80 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culumination mean annual increment (CMAI) is estimated to be from 85 to over 225 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, the low subsoil strength, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods.

Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. This unit is suited to only limited use as summer range because of steep slopes.

118 - Crozier-McCarthy complex, 5 to 30 percent slopes.

This map unit is on mountainsides. Slope is 5 to 30 percent. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 2,000 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 60 percent Crozier loam and 30 percent McCarthy gravelly sandy loam. The percentage may vary from one area to another.

Included in this map unit are small areas of Cohasset and Ledmount soils. Also included are small areas of a soil similar to McCarthy that has less than 35 percent coarse fragments in the subsoil and a soil similar to McCarthy that is over 40 inches deep. Included areas make up about 10 percent of the total acreage.

The Crozier soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark brown loam about 6 inches thick. The upper 10 inches of the subsoil is strong brown loam. The lower 18 inches is yellowish red cobbly loam. Fractured and weathered andesitic lahar is at a depth of 34 inches.

Permeability of the Crozier soil is moderate. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concern in producing and harvesting timber on this unit is maintaining the soil depth and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tent to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

119 - Crozier-McCarthy complex, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 2,000 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 40 percent Crozier loam and 40 percent McCarthy gravelly sandy loam. The percentage may vary from one area to another.

Included in this map unit are small areas of Cohasset and Ledmount soils. Also included are small areas of a soil similar to McCarthy that has less than 35 percent coarse fragments in the subsoil and a soil similar to McCarthy that is over 40 inches deep. In a few areas slopes are over 50 percent. Included areas make up about 20 percent of the total acreage.

The Crozier soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark brown loam about 6 inches thick. The upper 10 inches of the subsoil is strong brown loam. The lower 18 inches is yellowish red cobbly loam. Fractured and weathered andesitic lahar is at a depth of 34 inches.

Permeability of the Crozier soil is moderate. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to the intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. This unit is suited to only limited use as summer range because of steep slopes.

120 - Cryumbrepts association, 5 to 50 percent slopes.

This map unit is on glacial moraines, outwash terraces, and alluvial plains. The Red Fir series typically occurs on the Cryumbrepts component of this unit. The Alder series typically occurs on the Cryumbrepts, wet component. Elevation is 6,500 to 9,500 feet. The average annual precipitation is 50 to 70 inches.

This unit is 55 percent Cryumbrepts and 15 percent Cryumbrepts, wet. The percentage may vary from one area to another.

Included in this unit are small areas of a soil similar to Cryumbrepts that has a thinner, lighter-colored surface horizon and a soil similar to Cryumbrepts that has a summer temperature which varies more than 9°F from the winter soil temperature. Also included are small areas of rock outcrop. Included areas make up about 30 percent of the total acreage.

The Cryumbrepts is moderately deep, deep, or very deep and moderately well drained or well drained. It formed in glacially deposited material. Typically, it has a dark surface and loamy sand, coarse sandy loam, or sandy loam textures throughout the profile with rock fragments ranging from 15 to 60 percent. In some areas the surface layer is stony or bouldery.

Permeability of the Cryumbrepts is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 60 inches or more. The maximum erosion hazard is high.

The Cryumbrepts, wet is moderately deep, deep, or very deep and somewhat poorly drained or poorly drained. It formed in mixed glacial alluvium. The Cryumbrepts, wet is along drainages, and on flood plains on slopes of 5 to 30 percent. Typically, the surface horizon is dark with high organic matter. It is a highly variable soil with textures including loamy sand, sandy loam, loam, or silt loam with rock fragments ranging from 5 to 60 percent.

Permeability of the Cryumbrepts, wet is moderately rapid. Effective rooting depth is 20 to 40 inches, with a water table generally within 30 inches of the surface. The maximum erosion hazard is high.

The Cryumbrepts is used mainly for recreation and summer range. The main concerns in management on this soil are the steep slopes and the hazard of erosion. This soil is not available for the production of timber because of its isolated location in or adjacent to wilderness areas.

The Cryumbrepts, wet is used mainly for summer range and wildlife habitat. The main concerns in management on this soil are the presence of a water table and seasonal flooding. This soil is not suited to the production of timber. Grazing should be delayed until the soil has drained and is firm enough to withstand tramping by livestock.

121 - Dome coarse sandy loam, 2 to 30 percent slopes.

This very deep, well drained soil is on outwash plains. It formed in glacial outwash composed primarilay of granitic rock. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 4,800 to 5,600 feet. The average annual precipitation is 55 to 60 inches.

Typically, the surface layer is brown coarse sandy loam about 7 inches thick. The subsoil is strong brown coarse sandy loam about 24 inches thick. The substratum to a depth of 60 inches or more is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is a gravelly sandy loam.

Included in this unit are small areas of Aquepts, Dome Variant, Pilliken, and Zeibright soils. Also included are small areas of a soil similar to Dome that has a dark colored surface horizon. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Dome soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Dome soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low available water capacity, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The low available water capacity in the surface layer significantly reduces conifer seeding survival on south and southwest facing slopes. The production of forage is transitory and limited by the amount of competition from conifers.

122 - Dome-Zeibright complex, 2 to 30 percent slopes.

This map unit is on outwash plains, mountainsides, and ridges. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 4,800 to 5,600 feet. The average annual precipitation is 55 to 60 inches.

This unit is 50 percent Dome coarse sandy loam and 30 percent Ziebright extremely gravelly coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Aquepts, Dome Variant, and Pilliken soils. Also included are small areas of a soil similar to Dome that has a dark colored surface horizon and a soil similar to Zeibright that has a light colored surface horizon. Included areas make up about 20 percent of the total acreage.

The Dome soil is very deep and well drained. It formed in glacial outwash composed primarily of granitic rock. Typically, the surface layer is brown coarse sandy loam about 7 inches thick. The subsoil is strong brown coarse sandy loam about 24 inches thick. The substratum to a depth of 60 inches or more is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is a gravelly sandy loam.

Permeability of the Dome soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The Zeibright soil is deep or very deep and well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is dark grayish brown extremely gravelly coarse sandy loam about 10 inches thick. The upper 25 inches of the substratum is brown and light yellowish brown extremely cobbly coarse sandy loam. The lower part to a depth of 61 inches is brownish yellow and light yellowish brown very cobbly and extremely stony coarse sandy loam. In some areas the surface layer is gravelly sandy loam or cobbly sandy loam.

Permeability of the Zeibright soil is moderately rapid. Available water capacity is very low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low available water capacity and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seeding survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedling difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

123 - Dome-Zeibright complex, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,300 to 5,600 feet. The average annual precipitation is 55 to 60 inches.

This unit is 50 percent Dome coarse sandy loam and 30 percent Ziebright extremely gravelly coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Lithic Xerumbrepts and Pilliken soils and rock outcrop. Also included are small areas of a soil similar to Dome that has a dark colored surface horizon and a soil similar to Ziebright that has a light colored surface horizon. Included areas make up about 20 percent of the total acreage.

The Dome soil is very deep and well drained. It formed in glacial outwash composed primarily of granitic rock. Typically, the surface layer is brown coarse sandy loam about 7 inches thick. The subsoil is strong brown coarse sandy loam about 24 inches thick. The substratum to a depth of 60 inches or more is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is a gravelly sandy loam.

Permeability of the Dome soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is greater than 60 inches. The maximum erosion hazard is high.

The Zeibright soil is deep or very deep and well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is dark grayish brown extremely gravelly coarse sandy loam about 10 inches thick. The upper 25 inches of the substratum is brown and light yellowish brown extremely cobbly coarse sandy loam. The lower part to a depth of 61 inches is brownish yellow and light yellowish brown very cobbly and extremely stony coarse sandy loam. In some areas the surface layer is gravelly sandy loam or cobbly sandy loam.

Permeability of the Zeibright soil is moderately rapid. Available water capacity is very low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for mixed conifer. The main concerns in producing and harvesting timber on this unit are the low available water capacity, the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity may significantly reduces conifer seeding survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedling difficult. This unit is suited to only limited use as summer range because of steep slopes.

124 - Dome Variant coarse sandy loam, 0 to 10 percent slopes.

This very deep, somewhat poorly drained soil is in small basins on glacial outwash plains. It formed in outwash from dominantly granitic rock. The Lodgepole Pine series typically occurs on this unit. Elevation is 5,000 to 5,400 feet. The average annual precipitation is 55 to 60 inches.

Typically, the surface layer is variegated brown, pale brown, and light yellowish brown coarse sandy loam about 22 inches thick. The subsoil is variegated very pale brown and brownish yellow coarse sandy loam about 33 inches thick. The substratum is variegated very pale brown, brownish yellow, and pinkish white coarse loamy sand to a depth of 60 inches or more. Depth to the water table fluctuates between 40 and 80 inches or more during summer and fall, and 20 and 60 inches during winter and spring.

Included in this unit are small areas of Aquepts, Dome, Umbrepts, and Zeibright soils. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Dome Variant soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is more than 60 inches, but may be limited for some plants by the water table. The maximum erosion hazard is low.

This unit is used mainly for timber production. It is also used for summer range.

This unit is poorly suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in the production and harvesting timber on this unit are the seasonal water table and the hazard of erosion. Because the rooting depth is restricted by a seasonally high water table, trees are occasionally subject to windthrow when the soil is wet and winds are strong. The removal of timber on this unit may cause reforestation problems associated with a high water table. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion.

125 - Fluvents, 0 to 10 percent slopes.

This very deep, moderately well drained or somewhat poorly drained soil occurs along narrow drainageways. It formed in mixed alluvial material. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,000 to 4,800 feet. The average annual precipitation is 50 to 60 inches.

Typically, it has light colored surfaces layers but may have thin dark strata. Textures are sandy loams to sands and are stratified. Rock fragment content is highly variable and some profiles contain up to 55 percent by volume.

Included in this unit are small areas of Aquepts, Holland, Jocal, Musick, Pilliken, and Umbrepts soils. Also included are small areas of riverwash and a soil similar to Fluvents that has some subsoil development. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Fluvents ranges from rapid to moderately slow. Available water capacity is moderate. Effective rooting depth is more than 60 inches, but may be limited for some plants by the water table, which fluctuates between 10 and 50 inches in the winter and 40 and 100 inches in the summer. The maximum erosion hazard is low.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in the production and harvesting of timber on this unit are the seasonal water table and the hazard of erosion. Because the rooting depth is restricted by a seasonally high water table, trees are occasionally subject to windthrow when the soil is wet and winds are strong. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion.

126 - Gerle coarse sandy loam, 2 to 30 percent slopes.

This very deep and well drained soil is on lateral and terminal moraines and glacial outwash. It formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,600 to 7,000 feet. The average annual precipitation is 55 to 70 inches.

Typically, the surface layer is dark brown and dark yellowish brown coarse sandy loam about 12 inches thick. The subsoil is yellowish brown and light yellowish brown sandy loam about 18 inches thick. The upper 11 inches of the substratum is yellowish brown coarse sandy loam. The lower part to a depth of 62 inches is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is gravelly sandy loam.

Included in this unit are small areas of Cryumbrepts, Notned, and Tallac soils. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Gerle soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Gerle soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit is the the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

127 - Gerle-Notned complex, 2 to 30 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,600 to 7,000 feet. The average annual precipitation is 55 to 70 inches.

This unit is 55 percent Gerle sandy loam and 25 percent Notned bouldery coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Ledford, Lithic Xerumbrepts, Lumberly, Tallac, Tinker, and Umbrepts soils. Also included are small areas of rock outcrop. Included areas make up about 20 percent of the total acreage.

The Gerle soil is very deep and well drained. It formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. Typically, the surface layer is dark brown and dark yellowish brown sandy loam about 12 inches thick. The subsoil is yellowish brown and light yellowish brown sandy loam about 18 inches thick. The upper 11 inches of the substratum is yellowish brown sandy loam. The lower part to a depth of 62 inches is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or gravelly sandy loam.

Permeability of the Gerle soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The Notned soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 4 inches of the surface layer is dark brown bouldery coarse sandy loam. The lower 12 inches is dark yellowish brown cobbly coarse sandy loam. The subsoil is brown and yellowish brown very cobbly coarse sandy loam about 30 inches thick. The substratum to a depth of 62 inches is brownish yellow, very pale brown, and yellow very cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam and less commonly loamy sand.

Permeability of the Notned soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit is the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult.

Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

128 - Gerle-Tallac complex, 5 to 30 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,800 to 7,000 feet. The average annual precipitation is 55 to 70 inches.

This unit is 45 percent Gerle sandy loam and 35 percent Tallac very cobbly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Notned, Tinker, and Umbrepts soils. Also included are small areas of rock outcrop and boulders. Included areas make up about 20 percent of the total acreage.

The Gerle soil is very deep and well drained. It formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. Typically, the surface layer is dark brown and dark yellowish brown sandy loam about 12 inches thick. The subsoil is yellowish brown and light yellowish brown sandy loam about 18 inches thick. The upper 11 inches of the substratum is yellowish brown sandy loam. The lower part to a depth of 62 inches is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or gravelly sandy loam.

Permeability of the Gerle soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The Tallac soil is deep to very deep and moderately well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

129 - Gerle-Tallac complex, 30 to 50 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,800 to 7,000 feet. The average annual precipitation is 55 to 70 inches.

This unit is 45 percent Gerle sandy loam and 35 percent Tallac very cobbly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Notned, Tinker, and Umbrepts soils. Also included are small areas of rock outcrop and boulders. Included areas make up about 20 percent of the total acreage.

The Gerle soil is very deep and well drained. It formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. Typically, the surface layer is dark brown and dark yellowish brown sandy loam about 12 inches thick. The subsoil is yellowish brown and light yellowish brown sandy loam about 18 inches thick. The upper 11 inches of the substratum is yellowish brown sandy loam. The lower part to a depth of 62 inches is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or gravelly sandy loam.

Permeability of the Gerle soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The Tallac soil is deep or very deep and moderately well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations.Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This unit is suited to only limited use as summer range because of steep slopes.

130 - Gerle-Umbrepts association, 2 to 15 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Mixed Conifer-Fir series typically occurs on the Gerle component of this unit. The Alder series typically occurs on the Umbrepts component of this unit. Elevation is 6,000 to 7,500 feet. The average annual precipitation is 50 to 65 inches.

This unit is 60 percent Gerle sandy loam and 20 percent Umbrepts. The percentage may vary from one area to another.

Included in this unit are small areas of Cryumbrepts, Notned, and Tallac soils. Also included are small areas of riverwash. Included areas make up about 20 percent of the total acreage.

The Gerle soil is very deep and well drained. It formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. Typically, the surface layer is dark brown and dark yellowish brown sandy loam about 12 inches thick. The subsoil is yellowish brown and light yellowish brown sandy loam about 18 inches thick. The upper 11 inches of the substratum is yellowish brown sandy loam. The lower part to a depth of 62 inches is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or gravelly sandy loam.

Permeability of the Gerle soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is greater than 60 inches. The maximum erosion hazard is moderate.

Umbrepts are somewhat poorly drained or moderately well drained soils that formed in alluvial material along drainages and on glacial outwash on slopes of 2 to 9 percent. They have dark surface horizons. The profile has stratified layers with textures ranging from clays to loams with 50 to 70 percent rock fragments.

Permeability of the Umbrepts soil is slow or moderately slow. The maximum erosion hazard is moderate.

This unit is used for timber production. It is also used for summer range.

The Gerle soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concern in producing and harvesting timber on this soil is the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

The Umbrepts soil is not suited to the production of timber because of poor drainage conditions. The main concerns in grazing animals on this soil are the seasonal water table and the hazard of stream bank erosion. Because the rooting depth is restricted by a seasonally high water table, trees growing in soils bordering the Umbrepts soil are occasionally subject to windthrow when the soil is wet and winds are strong. Because of the water table, harvest operations on adjacent areas must be carefully planned to avoid ground equipment operations in these areas. Grazing should be delayed until the soil has drained and is firm enough to withstand trampling by livestock. Overuse can reduce sod type plant cover and cause gully erosion.

131 - Hangtown-Lithic Xerumbrepts complex, 15 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 5,800 to 7,800 feet. The average annual precipitation is 55 to 70 inches.

This unit is 45 percent Hangtown gravelly fine sandy loam and 40 percent Lithic Xerumbrepts. The percentage may vary from one area to another.

Included in this unit are small areas of Smokey soils and rock outcrop. Also included are small areas of a soil similar to Hangtown that has higher clay content in the subsoil. Included areas make up about 15 percent of the total acreage.

The Hangtown soil is deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The upper 7 inches of the subsoil is dark brown very stony fine sandy loam. The lower 14 inches is brown very gravelly fine sandy loam. The upper 11 inches of the substratum is brown very cobbly fine sandy loam. The lower part is pale brown very stony fine sandy loam about 11 inches thick. Highly fractured metasedimentary rock is at a depth of 46 inches. In some areas the surface layer is sandy loam, fine sandy loam, or gravelly fine sandy loam.

Permeability of the Hangtown soil is moderately rapid. Available water capacity is low. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is high.

The Lithic Xerumbrepts is shallow and excessively drained. It formed in material weathered from metamorphic rock. Typically, it has dark colors throughout the profile. Textures are sandy loam, fine sandy loam, or loam with 5 to 65 percent rock fragments.

Permeability of the Lithic Xerumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is very high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used for timber production. It is also used for summer range.

Much of this unit is not suited for timber production because of the areas of shallow Lithic Xerumbrepts . The Hangtown soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. Potential surface runoff from shallow soil areas may require modification in skid trail layout, erosion control measures, and ground cover requirements to prevent erosion from concentrated flows. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This unit is suited to only limited use as summer range because of steep slopes.

132 - Hangtown-Smokey complex, 5 to 30 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 5,800 to 7,900 feet. The average annual precipitation is 55 to 70 inches.

This unit is 50 percent Hangtown gravelly sandy loam and 35 percent Smokey gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Hartless, Mieruf, Tallac, and Tinker soils. Also included are small areas of rock outcrop. Included areas make up about 15 percent of the total acreage.

The Hangtown soil is deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The upper 7 inches of the subsoil is dark brown very stony fine sandy loam. The lower 14 inches is brown very gravelly fine sandy loam. The upper 11 inches of the substratum is brown very cobbly fine sandy loam. The lower part is pale brown very stony fine sandy loam about 11 inches thick. Highly fractured metasedimentary rock is at a depth of 46 inches. In some areas the surface layer is sandy loam, fine sandy loam, or gravelly fine sandy loam.

Permeability of the Hangtown soil is moderately rapid. Available water capacity is low. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

The Smokey soil is moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is brown gravelly loam about 3 inches thick. The subsoil is light yellowish brown very gravelly loam about 13 inches thick. The substratum is brownish yellow very gravelly loam about 18 inches thick. Highly fractured metasedimentary rock is at a depth of 34 inches.

Permeability of the Smokey soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth, the low available water capacity, and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The production of forage is transitory and limited by the amount of competition from conifers.

133 - Hangtown-Smokey complex, 30 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 5,800 to 7,900 feet. The average annual precipitation is 55 to 70 inches.

This unit is 45 percent Hangtown gravelly sandy loam and 40 percent Smokey gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Hartless, Mieruf, Tallac, and Tinker soils. Also included are small areas of rock outcrop. Included areas make up about 15 percent of the total acreage.

The Hangtown soil is deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The upper 7 inches of the subsoil is dark brown very stony fine sandy loam. The lower 14 inches is brown very gravelly fine sandy loam. The upper 11 inches of the substratum is brown very cobbly fine sandy loam. The lower part is pale brown very stony fine sandy loam about 11 inches thick. Highly fractured metasedimentary rock is at a depth of 46 inches. In some areas the surface layer is sandy loam, fine sandy loam, or gravelly fine sandy loam.

Permeability of the Hangtown soil is moderately rapid. Available water capacity is low. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is high.

The Smokey soil is moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is brown gravelly loam about 3 inches thick. The subsoil is light yellowish brown very gravelly loam about 13 inches thick. The substratum is brownish yellow very gravelly loam about 18 inches thick. High fractured metasedimentary rock is at a depth of 34 inches.

Permeability of the Smokey soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. This unit is suited to only limited use as summer range because of steep slopes.

134 - Hartless very gravelly loam, 5 to 30 percent slopes.

This deep or very deep, well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 55 to 65 inches.

Typically, the surface layer is very dark grayish brown very gravelly loam about 7 inches thick. The subsoil is brown, strong brown, and reddish yellow very gravelly fine sandy loam about 57 inches thick. In some areas the surface layer is a very gravelly sandy loam, gravelly sandy loam, or gravelly loam.

Included in this unit are small areas of Jocal, Lithic Xerumbrepts, Mieruf, and Neuns soils and rock outcrop. Also included are small areas of a soil similar to Hartless that has an increase of clay in the subsoil, and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Hartless soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Hartless soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for mixed conifer. The main concerns in producing and harvesting timber on this unit are the low available water capacity and the hazard of erosion. The low available water capacity in the surface layer significantly reduces conifer seeding survival on south and southwest facing slopes. An adequate ground cover must be retained to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

135 - Hartless very gravelly loam, 30 to 50 percent slopes.

This deep or very deep, well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 55 to 65 inches.

Typically, the surface layer is very dark grayish brown very gravelly loam about 7 inches thick. The subsoil is brown, strong brown, and reddish yellow very gravelly fine sandy loam about 57 inches thick. In some areas the surface layer is a very gravelly sandy loam, gravelly sandy loam, or gravelly loam.

Included in this unit are small areas of Jocal, Lithic Xerumbrepts, Mieruf and Neuns soils and rock outcrop. Also included are small areas of a soil similar to Hartless that has an increase of clay in the subsoil, and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Hartless soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Hartless soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for mixed conifer. The main concerns in producing and harvesting timber on this soil are the steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer signeficantly reduces conifer seedling survival on south and southwest facing slopes. This soil is suited to only limited use as summer range because of steep slopes.

136 - Hartless-Mieruf very gravelly loams, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 50 percent Hartless very gravelly loam and 30 percent Mieruf very gravelly silt loam. The percentage may vary from one area to another.

Included in this unit are small areas of Jocal, Lithic Xerumbrepts, and Neuns soils and rock outcrop. Also included are small areas of a soil similar to Mieruf that is 20 to 40 inches deep, a soil similar to Hartless that has an increase of clay in the subsoil, and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 20 percent of the total acreage.

The Hartless soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is very dark grayish brown very gravelly loam about 7 inches thick. The subsoil is brown, strong brown, and reddish yellow very gravelly fine sandy loam about 57 inches thick. In some areas the surface layer is a very gravelly sandy loam, gravelly sandy loam, or gravelly loam.

Permeability of the Hartless soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The Mieruf soil is deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is dark brown very gravelly loam about 6 inches thick. The upper 19 inches of the subsoil is brown and reddish yellow gravelly loam. The lower 25 inches is reddish yellow loam. Weathered, fractured metasedimentary rock is at a depth of 50 inches. In some areas the surface layer is gravelly sandy loam.

Permeability of the Mieruf soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low available water capacity and the hazard of erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

137 - Hartless-Mieruf very gravelly loams, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 60 percent Hartless very gravelly loam and 20 percent Mieruf very gravelly silt loam. The percentage may vary from one area to another.

Included in this unit are small areas of Jocal, Lithic Xerumbrepts, and Neuns soils and rock outcrop. Also included are small areas of a soil similar to Mieruf that is 20 to 40 inches deep, a soil similar to Hartless that has an increase of clay in the subsoil, and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 20 percent of the total acreage.

The Hartless soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is very dark grayish brown very gravelly loam about 7 inches thick. The subsoil is brown, strong brown, and reddish yellow very gravelly fine sandy loam about 57 inches thick. In some areas the surface layer is a very gravelly sandy loam, gravelly sandy loam, or gravelly loam.

Permeability of the Hartless soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The Mieruf soil is deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is dark brown very gravelly loam about 6 inches thick. The upper 19 inches of the subsoil is brown and reddish yellow gravelly loam. The lower 25 inches is reddish yellow loam. Weathered, fractured metasedimentary rock is at a depth of 50 inches. In some areas the surface layer is gravelly sandy loam.

Permeability of the Mieruf soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and south facing slopes. This unit is suited to only limited use as summer range because of steep slopes.

138 - Hartless-Mieruf very gravelly loams, 50 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 65 percent Hartless very gravelly loam and 15 percent Mieruf very gravelly silt loam. The percentage may vary from one area to another.

Included in this unit are small areas of Lithic Xerumbrepts and Neuns soils and rock outcrop. Also included is a soil similar to Mieruf that is 20 to 40 inches deep and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 20 percent of the total acreage.

The Hartless soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is very dark grayish brown very gravelly loam about 7 inches thick. The subsoil is brown, strong brown, and reddish yellow very gravelly fine sandy loam about 57 inches thick. In some areas the surface layer is a very gravelly sandy loam, gravelly sandy loam, or gravelly loam.

Permeability of the Hartless soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The Mieruf soil is deep and well drained. It formed in material weathered from metasedimentary rock. Typically the surface layer is dark brown very gravelly loam about 6 inches thick. The upper 19 inches of the subsoil is brown and reddish yellow gravelly loam. The lower 25 inches is reddish yellow loam. Weathered, fractured metasedimentary rock is at a depth of 50 inches. In some areas the surface layer is gravelly sandy loam.

Permeability of the Mieruf soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them seperately. This unit is used for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for mixed conifer. The main concerns in producing and harvesting timber on this unit are the very steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Cable yarding system are suited to this unit because they protect the surface soil from excessive disturbances. The use of ground base equipment for site prepartion is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. The low available water capacity significantly reduces conifer seeding survival on south and southwest facing slopes. This unit is suited to only limited use as summer range because of the very steep slopes.

139 - Hartless-Neuns Complex, 15 to 30 percent slope.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 50 to 65 inches.

This unit is 50 percent Hartless very gravelly loam and 30 percent Neuns gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Jocal, Lithic Xerumbrepts, and Mieruf soils and rock outcrop. Also included are small areas of a soil similar to Hartless that has an increase of clay in the subsoil and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 20 percent of the total acreage.

The Hartless soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is very dark grayish brown very gravelly loam about 7 inches thick. The subsoil is brown, strong brown, and reddish yellow very gravelly fine sandy loam about 57 inches thick. In some areas the surface layer is a very gravelly sandy loam, gravelly sandy loam, or gravelly loam.

Permeability of the Hartless soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The Neuns soil is moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 3 inches of the surface layer is yellowish brown gravelly loam. The lower 9 inches is strong brown very cobbly sandy loam. The subsoil is reddish yellow very cobbly sandy loam about 22 inches thick. Hard, fractured metasedimentary rock is at a depth of 34 inches.

Permeability of the Neuns soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low available water capacity, maintaining the soil depth, and the hazard of erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

140 Hartless-Neuns Complex, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 50 to 65 inches.

This unit is 45 percent Hartless very gravelly loam and 35 percent Neuns gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Jocal, Lithic Xerumbrepts, and Mieruf soils and rock outcrop. Also included is a soil similar to Hartless that has an increase of clay in the subsoil and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 20 percent of the total acreage.

The Hartless soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is very dark grayish brown very gravelly loam about 7 inches thick. The subsoil is brown, strong brown, and reddish yellow very gravelly fine sandy loam about 57 inches thick. In some areas the surface layer is a very gravelly sandy loam, gravelly sandy loam, or gravelly loam.

Permeability of the Hartless soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The Neuns soil is moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 3 inches of the surface layer is yellowish brown gravelly loam. The lower 9 inches is strong brown very cobbly sandy loam. The subsoil is reddish yellow very cobbly sandy loam about 22 inches thick. Hard, fractured metasedimentary rock is at a depth of 34 inches.

Permeability of the Neuns soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for mixed conifers. The main concerns in producing and harvesting timber on this unit are the low available water capacity, the steep and very steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity significantly reduces conifer seeding survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedling difficult. This unit is suited to only limited use as summer range because of steep and very steep slopes.

141 Hartless Variant very gravelly sandy loam, 30 to 50 percent slopes.

This deep or very deep and well drained soil is on the sides of volcanic tabular ridges. It formed in material weathered from basaltic lahar. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 5,100 to 5,300 feet. The average annual precipitation is 55 to 60 inches.

Typically, the surface layer is brown very gravelly sandy loam about 12 inches thick. The subsoil is light brown gravelly sandy loam about 9 inches thick. The upper 20 inches of the substratum is pale brown very cobbly sandy loam. The lower part to a depth of greater than 60 inches is pale brown loamy sand. In some areas the surface layer is gravelly, cobbly, or very cobbly sandy loam.

Included in this unit are small areas of Cohasset and Ziebright soils. Also included are small areas of a soil similar to Hartless Variant that has less than 35 percent rock fragments. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Hartless Variant soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Hartless Variant soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity

142 Holland loam, 5 to 30 percent slopes.

This very deep and well drained soil is on mountainsides and ridges. It formed in material weathered from granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,300 to 5,000 feet. The average annual precipitation is 50 to 60 inches.

Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Included in this unit are small areas of Bighill, Chaix, Musick, and Pilliken soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep and a soil similar to Holland that has up to 25 percent rock fragments. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Holland soil is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the low subsoil strength and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The production of forage is transitory and limited by the amount of competition from conifer.

143 Holland loam, 30 to 50 percent slopes.

This very deep and well drained soil is on mountainsides and ridges. It formed in material weathered from granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,800 to 4,800 feet. The average annual precipitation is 50 to 60 inches.

Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Included in this unit are small areas of Bighill, Chaix, Musick, and Pilliken soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep and a soil similar to Holland that has up to 25 percent rock fragments. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Holland soil is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. This soil is suited to only limited use as summer range because of steep slopes.

144 Holland-Bighill complex, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,300 to 4,600 feet. The average annual precipitation is 50 to 60 inches.

This unit is 50 percent Holland loam and 30 percent Bighill coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Chaix, Musick, and Pilliken soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep and a soil similar to Holland that has up to 25 percent rock fragments. Included areas make up about 20 percent of the total acreage.

The Holland soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The Bighill soil is moderately deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 5 inches of the surface layer is dark grayish brown coarse sandy loam. The lower 12 inches is brown gravelly sandy loam. The subsoil is brown cobbly sandy loam about 15 inches thick. Weathered granitic rock is at a depth of 32 inches.

Permeability of the Bighill soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth, the low subsoil strength, and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The production of forage is transitory and limited by the amount of competition from conifers.

145 Holland-Bighill complex, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,100 to 4,600 feet. The average annual precipitation is 50 to 60 inches.

This unit is 45 percent Holland loam and 35 percent Bighill coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Chaix, Musick, and Pilliken soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep and a soil similar to Holland that has up to 25 percent rock fragments. Included areas make up about 20 percent of the total acreage.

The Holland soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The Bighill soil is moderately deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 5 inches of the surface layer is dark grayish brown coarse sandy loam. The lower 12 inches is brown gravelly sandy loam. The subsoil is brown cobbly sandy loam about 15 inches thick. Weathered granitic rock is at a depth of 32 inches.

Permeability of the Bighill soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep and very steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. This unit is suited to only limited use as summer range because of the steep and very steep slopes.

146 - Holland-Musick loams, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 2,500 to 5,000 feet. The average annual precipitation is 40 to 60 inches.

This unit is 50 percent Holland loam and 30 percent Musick loam. The percentage may vary from one area to another.

Included in this unit are small areas of Bighill, Chaix, and Pilliken soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep and a soil similar to Holland and Musick that has up to 25 percent rock fragments throughout the profile. Included areas make up about 20 percent of the total acreage.

The Holland soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The Musick soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 6 inches thick. The upper 18 inches of the subsoil is yellowish red clay loam. The lower 28 inches is red and yellowish red sandy clay loam. The upper 16 inches of the substratum is yellowish red gravelly sandy clay loam. The lower part to a depth of 71 inches is strong brown gravelly sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Musick soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The production of forage is transitory and limited by the amount of competition from conifers.

147 - Holland-Musick loams, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 2,500 to 5,000 feet. The average annual precipitation is 40 to 60 inches.

This unit is 60 percent Holland loam and 20 percent Musick loam. The percentage may vary from one area to another.

Included in this unit are small areas of Bighill, Chaix, and Pilliken soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep and a soil similar to Holland and Musick that has up to 25 percent rock fragments throughout the profile. Included areas make up about 20 percent of the total acreage.

The Holland soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The Musick soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 6 inches thick. The upper 18 inches of the subsoil is yellowish red clay loam. The lower 28 inches is red and yellowish red sandy clay loam. The upper 16 inches of the substratum is yellowish red gravelly sandy clay loam. The lower part to a depth of 71 inches is strong brown gravelly sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Musick soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and the low subsoil strength. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars of ground cover. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This unit is suited to only limited use as summer range because of steep slopes.

148 - Holland-Pilliken association, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,500 to 6,000 feet. The average annual precipitation is 40 to 65 inches.

This unit is 50 percent Holland loam and 30 percent Pilliken coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Musick soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep. Included areas make up about 20 percent of the total acreage.

The Holland soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The Pilliken soil is deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The production of forage is transitory and limited by the amount of competition from conifers.

149 - Holland-Pilliken association, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,500 to 6,000 feet. The average annual precipitation is 40 to 65 inches.

This unit is 45 percent Holland loam and 35 percent Pilliken coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Musick soils. Also included are small areas of a soil similar to Holland that is 20 to 60 inches deep. Included areas make up about 20 percent of the total acreage.

The Holland soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is brown loam about 8 inches thick. The upper 9 inches of the subsoil is strong brown sandy clay loam. The lower 39 inches is reddish yellow sandy clay loam. The substratum to a depth of 64 inches is yellowish brown and brownish yellow sandy loam. In some areas the surface layer is sandy loam.

Permeability of the Holland soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The Pilliken soil is deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and the low subsoil strength. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy period. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This unit is suited to only limited use as summer range because of steep slopes.

150 - Jocal loam, 5 to 30 percent slopes.

This deep or very deep and well drained soil is on mountainsides and ridgetops. It formed in material weathered from metasedimentary rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 5,500 feet. The average annual precipitation is 40 to 60 inches.

Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Included in this unit are small areas of Hartless, Mariposa, Mieruf, Neuns, and Sites soils. Included areas make up about 20 perent of the total acreage. The percentage may vary from one area to another.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Jocal soil is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the low subsoil strength and the hazard or erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatments for dust abatement during dry periods to reduce road surface degradation and to improve visibility. The production of forage is transitory and limited by the amount of competition from conifers.

151 - Jocal loam, 30 to 50 percent slopes.

This deep or very deep and well drained soil is on mountainsides and ridgetops. It formed in material weathered from metasedimentary rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,000 to 5,500 feet. The average annual precipitation is 40 to 60 inches.

Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Included in this unit are small areas of Hartless, Mariposa, Mieruf, Neuns, and Sites soils. Included areas make up about 20 perent of the total acreage. The percentage may vary from one area to another.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Jocal soil is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This soil is suited to only limited use as summer range because of steep slopes.

152 - Jocal-Hartless complex, 5 to 30 percent slopes.

This map unit is on mountainsides and ridgetops. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 45 percent Jocal loam and 30 percent Hartless extremely gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Mieruf and Neuns soils. Included areas make up about 25 percent of the total acreage.

The Jocal soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The Hartless soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 5 inches of the surface layer is very dark grayish brown extremely gravelly loam. The lower 6 inches is dark yellowish brown extremely gravelly fine sandy loam. The subsoil is yellowish red and strong brown very cobbly sandy clay loam about 29 inches thick. The substratum is reddish yellow cobbly sandy clay loam about 7 inches thick. Fractured metasedimentary rock is at a depth of 47 inches.

Permeability of the Hartless soil is moderate. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength, the low available water capacity, and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock framents in the surface layer in some areas makes planting seedlings difficult. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. The production of forage is transitory and limited by the amount of competition from conifers.

153 - Jocal-Hartless complex, 30 to 50 percent slopes.

This map unit is on mountainsides and ridgetops. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 40 percent Jocal loam and 35 percent Hartless extremely gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Lithic Xerumbrepts, Mieruf, and Neuns soils. Included areas make up about 25 percent of the total acreage.

The Jocal soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The Hartless soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 5 inches of the surface layer is very dark grayish brown extremely gravelly loam. The lower 6 inches is dark yellowish brown extremely gravelly fine sandy loam. The subsoil is yellowish red and strong brown very cobbly sandy clay loam about 29 inches thick. The substratum is reddish yellow cobbly sandy clay loam about 7 inches thick. Fractured metasedimentary rock is at a depth of 47 inches.

Permeability of the Hartless soil is moderate. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to intensive production of timber. The culumination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, the low available water capacity, and the low subsoil strength. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This unit is suited to only limited use as summer range because of steep slopes.

154 - Jocal-Mariposa-Umbrepts association, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on the Jocal and Mariposa components of this unit. The Maple-Alder-Dogwood series typically occurs on the Umbrepts component. Elevation is 2,000 to 5,000 feet. The average annual precipitation is 40 to 60 inches.

This unit is 40 percent Jocal loam, 35 percent Mariposa gravelly silt loam, and 15 percent Umbrepts. The percentage may vary from one area to another.

Included in this unit are small areas of Maymen soils. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

The Jocal soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The Mariposa soil is shallow to moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is reddish yellow gravelly silty clay loam about 25 inches thick. Highly fractured and uptilted metasedimentary rock is at a depth of 30 inches. In some areas the surface layer is loam.

Permeability of the Mariposa soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 35 inches. The maximum erosion hazard is high.

The Umbrepts is a somewhat poorly drained or moderately well drained soils that formed in alluvial material along drainages. Typically, it has dark surface layers. The profile has stratified layers with textures ranging from clays to loams with 50 to 70 percent rock fragments.

Permeability of the Umbrepts is slow or moderately slow and mottles are common in the lower subsoil horizons. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Jocal soil is well suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Following road construction and timber harvest activities, road failures and landslides may occur. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. This soil is suited to only limited use as summer range because of steep and very steep slopes.

The Mariposa soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect

the soil surface from erosion. Because soil depth varies, tree planting may be difficult and seedling survival may be low when the soil is shallow. Following road construction and timber harvest activities, road failures and landslides may occur. This soil is suited to only limited use as summer range because of steep and very steep slopes.

The Umbrepts is not suited to the production of timber because of poor drainage conditions. The main concerns in grazing animals on this soil are the high seasonal water table and the stability of stream banks. Because the rooting depth is restricted by a seasonally high water table, trees growing in soils bordering the Umbrepts are occasionally subject to windthrow when the soil is wet and winds are strong. Because of its water table, harvest operations on adjacent areas must be carefully planned to avoid ground equipment operations in these areas. Grazing should be delayed until the soil has drained and is firm enough to withstand trampling by livestock.

155 Jocal-Sites loams, 5 to 30 percent slopes.

This map unit is on mountainsides and ridgetops. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,400 to 3,800 feet. The average annual precipitation is 45 to 60 inches.

This unit is 50 percent Jocal loam and 30 percent Sites loam. The percentage may vary from one area to another.

Included in this unit are small areas of Hartless and Mariposa soils. Included areas make up about 20 percent of the total acreage.

The Jocal soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The Sites soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rocks. Typically, the surface layer is reddish brown loam about 3 inches thick. The subsoil to a depth of 60 inches is red clay loam and clay. In some areas the organic matter content is less than is defined for the series.

Permeability of the Sites soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. The production of forage is transitory and limited by the amount of competition from conifers.

156 - Ledford sandy loam, 15 to 50 percent slopes.

This deep, somewhat excessively drained soil is on mountainsides. It formed in material weathered from granitic rock. The Red Fir series typically occurs on this unit. Elevation is 5,600 to 6,400 feet. The average annual precipitation is 55 to 70 inches.

Typically, the upper 2 inches of the surface layer is dark brown sandy loam. The lower part is dark brown and brown coarse sandy loam about 10 inches thick. The subsoil is yellowish brown coarse sandy loam about 25 inches thick. The substratum is light yellowish brown coarse sandy loam about 10 inches thick. Highly weathered granitic rock is at a depth of 47 inches.

Included in this unit are small areas of Gerle, Lithic Cryumbrepts, Lithic Xerumbrepts, Lumberly, Notned, and Umbrepts soils. Also included are small areas of rock outcrop. Included areas make up about 15 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Ledford soil is rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

This soil is used mainly for timber production. It is also used for summer range.

The Ledford soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This soil is suited to only limited use as summer range because of steep slopes.

157 - Ledford-Notned complex, 5 to 30 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 55 to 70 inches.

This unit is 55 percent Ledford sandy loam and 35 percent Notned bouldery coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Cryumbrepts, wet soils and rock outcrop. Also included are small areas of a soil similar to Ledford that has sandy textures throughout and a thin dark surface horizon. Included areas make up about 10 percent of the total acreage.

The Ledford soil is deep and somewhat excessively drained. It formed in material weathered from granitic rock. Typically, the upper 2 inches of the surface layer is dark brown sandy loam. The lower part is dark brown and brown coarse sandy loam about 10 inches thick. The subsoil is yellowish brown coarse sandy loam about 25 inches thick. The substratum is light yellowish brown coarse sandy loam about 10 inches thick. Highly weathered granitic rock is at a depth of 47 inches.

Permeability of the Ledford soil is rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

The Notned soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 4 inches of the surface layer is dark brown bouldery coarse sandy loam. The lower 12 inches is dark yellowish brown cobbly coarse sandy loam. The subsoil is brown and yellowish brown very cobbly coarse sandy loam about 30 inches thick. The substratum to a depth of 62 inches is brownish yellow, very pale brown, and yellow very cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or loamy sand.

Permeability of the Notned soil is moderately rapid. Available water capacity is low. Effective rooting depth is greater than 60 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit is the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

158 - Ledford-Notned complex, 30 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 55 to 70 inches.

This unit is 60 percent Ledford sandy loam and 30 percent Notned bouldery coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Cryumbrepts, wet soils and rock outcrop. Also included are small areas of a soil similar to Ledford that has sandy textures throughout and a thin dark surface horizon. Included areas make up about 10 percent of the total acreage.

The Ledford soil is deep and somewhat excessively drained. It formed in material weathered from granitic rock. Typically, the upper 2 inches of the surface layer is dark brown sandy loam. The lower part is dark brown and brown coarse sandy loam about 10 inches thick. The subsoil is yellowish brown coarse sandy loam about 25 inches thick. The substratum is light yellowish brown coarse sandy loam about 10 inches thick. Highly weathered granitic rock is at a depth of 47 inches.

Permeability of the Ledford soil is rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

The Notned soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 4 inches of the surface layer is dark brown bouldery coarse sandy loam. The lower 12 inches is dark yellowish brown cobbly coarse sandy loam. The subsoil is brown and yellowish brown very cobbly coarse sandy loam about 30 inches thick. The substratum to a depth of 62 inches is brownish yellow, very pale brown, and yellow very cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or loamy sand.

Permeability of the Notned soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This unit is suited to only limited use as summer range because of steep slopes.

159 - Ledmount-Rock outcrop association, 2 to 30 percent slopes.

This map unit is on the tops and sides of volcanic tabular ridges. The Greenleaf Manzanita series typically occurs on this unit. Elevation is 2,000 to 6,000 feet. The average annual precipitation is 45 to 55 inches.

This unit is 50 percent Ledmount cobbly sandy loam and 30 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of McCarthy soils. Also included are small areas of a soil similar to Ledmount that has an eroded surface horizon and is less than 10 inches deep. Included areas make up about 20 percent of the total acreage.

The Ledmount soil is shallow and somewhat excessively drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark grayish brown and dark brown cobbly sandy loam about 15 inches thick over fractured, slightly weathered andesitic lahar.

Permeability of the Ledmount soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is moderate.

Rock outcrop consists of areas of hard andesitic lahar, commonly called lava cap. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

The components of this unit are so intricately intermingled that it is not practical to manage them separately.

This unit is not suited to the production of timber. The highest growth rate is less than 20 cubic feet per acre per year.

160 - Ledmount-Rock outcrop association, 30 to 75 percent slopes.

This map unit is on the tops and sides of volcanic tabular ridges. The Greenleaf Manzanita series typically occurs on this unit. Elevation is 2,000 to 6,000 feet. The average annual precipitation is 45 to 55 inches.

This unit is 45 percent Ledmount cobbly sandy loam and 35 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of McCarthy soils. Also included are small areas of a soil similar to Ledmount that has an eroded surface horizon and is less than 10 inches deep. Included areas make up about 20 percent of the total acreage.

The Ledmount soil is shallow and somewhat excessively drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark grayish brown cobbly and dark brown sandy loam about 15 inches thick over fractured, slightly weathered andesitic lahar.

Permeability of the Ledmount soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is high.

Rock outcrop consists of areas of hard andesitic lahar, commonly called lava cap. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

The components of this unit are so intricately intermingled that it is not practical to manage them separately.

This unit is not suited to the production of timber. The highest growth rate is less than 20 cubic feet per acre per year.

161 - Lithic Cryumbrepts, 15 to 75 percent slopes.

This shallow, excessively drained soil is on ridgetops and mountainsides. It formed in material weathered from andesitic lahar. The Mule Ears series typically occurs on this unit. Areas of the Red Fir, Alder, Lodgepole Pine, and Mountain Hemlock series are also found throughout the unit. Elevation is 7,000 to 10,000 feet. The average annual precipitaion is 50 to 70 inches.

Typically, it is sandy loam, fine sandy loam, and loam with coarse fragments ranging from 20 to 80 percent. The surface horizon is dark, has low bulk density and has some amorphous clay.

Included in this unit are small areas of Andic Cryumbrepts. Also included are small areas of rock outcrop. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Lithic Cryumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is is 4 to 20 inches. The maximum erosion hazard is very high.

This unit is used mainly for recreation in Wilderness Areas. It is also used as summer range.

The Lithic Cryumbrepts is used mainly for recreation and summer range. The main concerns in management on this soil are the steep and very steep slopes, the high runoff potential, and the hazard of erosion. This soil is not forested and is not suited to the production of timber because of the shallow depth.

162 - Lithic Cryumbrepts-Waca association, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mountain Whitethorn series typically occurs on the Lithic Cryumbrepts component of this unit. The Red Fir series typically occurs on the Waca component. Elevation is 6,000 to 8,500 feet. Average annual precipitation is 50 to 65 inches.

The unit is 55 percent Lithic Cryumbrepts and 35 percent Waca cobbly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Windy soils. Also included are small areas of rock outcrop. Included areas make up about 15 percent of the total acreage.

The Lithic Cryumbrepts is shallow and excessively drained. It formed in material weathered from andesitic lahar. Typically, it is sandy loam, fine sandy loam, and loam with rock fragments ranging from 20 to 80 percent. The surface layer is dark, has low bulk density and has some amorphous clay.

Permeability of the Lithic Cryumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is is 4 to 20 inches. The maximum erosion hazard is moderate.

The Waca soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

This unit is used for limited timber production. It is also used for summer range.

The Lithic Cryumbrepts is used mainly for summer range. The main concerns in management on this soil are the high runoff potential, and the hazard of erosion. This soil is not forested and is not suited to the production of timber because of the shallow depth.

The Waca soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are maintaining the soil depth and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Potential surface runoff from the Lithic Cryumbrepts areas may require modification in skid trail layout, erosion control measures and ground cover requirements to prevent erosion from concentrated flows. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

163 - Lithic Cryumbrepts-Waca association, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mountain Whitethorn series typically occurs on the Lithic Cryumbrepts component of this unit. The Red Fir series typically occurs on the Waca component. Elevation is 6,000 to 8,500 feet. Average annual precipitation is 50 to 65 inches.

The unit is 55 percent Lithic Cryumbrepts and 35 percent Waca cobbly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Windy soils. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

The Lithic Cryumbrepts is shallow and excessively drained. It formed in material weathered from andesitic lahar. Typically, it is sandy loam, fine sandy loam, and loam with rock fragments ranging from 20 to 80 percent. The surface layer is dark, has low bulk density and has some amorphous clay.

Permeability of the Lithic Cryumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is is 4 to 20 inches. The maximum erosion hazard is very high.

The Waca soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

This unit is used for limited timber production. It is also used for summer range.

The Lithic Cryumbrepts soil is used mainly for summer range. The main concerns in management on this soil are the steep slopes, the high runoff potential, and the hazard of erosion. This soil is not forested and is not suited to the production of timber because of the shallow depth.

The Waca soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Potential surface runoff from the Lithic Cryumbrepts areas may require modification in skid trail layout, erosion control measures and ground cover requirements to prevent erosion from concentrated flows. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. This soil is suited to only limited use as summer range because of steep slopes.

164 - Lithic Xerumbrepts-Rock outcrop complex, 15 to 75 percent.

This map unit is on mountainsides. The Mountain Whitethorn series typically occurs on this unit. Elevation is 4,000 to 8,500 feet. The average annual precipitation is 50 to 70 inches.

This unit is 40 percent Lithic Xerumbrepts and 40 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Bighill, Chaix, Hartless, Holland, Ledford, Lumberly, and Neuns soils. Also included are small areas of slopes greater than 75 percent in the Rubicon Drainage. Included areas make up about 20 percent of the total acreage.

The Lithic Xerumbrepts is shallow and excessively drained. It formed in material weathered from granitic or metamorphic rock. Typically, it has dark colors throughout the profile. Textures are sand, loamy sand, sandy loam, fine sandy loam, or loam with 5 to 65 percent rock fragments.

Permeability of the Lithic Xerumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is very high.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic or metamorphic rock. Runoff is very rapid. Large quanities of water may concentrate of soils downslope, which increase the erosion hazard of the soils.

The components of this unit are so intricately intermingled that it is not practical to manage them seperately.

This unit is used mainly for summer range.

The Lithic Xerumbrepts soils are used mainly for recreation and summer range. The main concerns in management on the soil are steep and very steep slopes, the high runoff potential, and the hazard of erosion. This soil is not forested and is not suited to the production of timber because of the shallow depth.

165 - Lumberly gravelly coarse sandy loam, 5 to 30 percent slopes.

This moderately deep and well drained soil is on mountainsides. It formed in material weathered from granitic rock. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 55 to 70 inches.

Typically, the surface layer is grayish brown and yellowish brown gravelly coarse sandy loam about 10 inches thick. The subsoil is light brown and reddish yellow gravelly coarse sandy loam about 23 inches thick. Decomposed granitic rock is a depth of 33 inches. In some areas the surface layer is sandy loam.

Included in this unit are small areas of Ledford soil and Lithic Xerumbrepts. Also included are small areas of rock outcrop. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Lumberly soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

This soil is used mainly for timber production. It is also used for summer range.

The Lumberly soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are maintaining the soil depth and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

166 - Lumberly gravelly coarse sandy loam, 30 to 50 percent slopes.

This moderately deep and well drained soil is on mountainsides. It formed in material weathered from granitic rock. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 55 to 70 inches.

Typically, the surface layer is grayish brown and yellowish brown gravelly coarse sandy loam about 10 inches thick. The subsoil is light brown and reddish yellow gravelly coarse sandy loam about 23 inches thick. Decomposed granitic rock is a depth of 33 inches. In some areas the surface layer is sandy loam.

Included in this unit are small areas of Ledford soils and Lithic Xerumbrepts. Also included are small areas of rock outcrop. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Lumberly soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

This soil is used mainly for timber production. It is also used for summer range.

The Lumberly soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layer. An adequate ground cover must be retained to protect the soil surface from erosion. This soil is suited to only limited use as summer range because of the steep slopes.

167 - Mariposa gravelly silt loam, 5 to 30 percent slopes.

This shallow to moderately deep and well drained soil is on mountainsides and ridgetops. It formed in material weathered from metasedimentary rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,400 to 5,600 feet. The average annual precipitation is 50 to 60 inches.

Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is reddish yellow gravelly silty clay loam about 25 inches thick. Highly fractured and uptilted metasedimentary rock is at a depth of 30 inches. In some areas the surface layer is loam.

Included in this unit are small areas of Jocal soils and Lithic Xerumbrepts. Also included are small areas of rock outcrop. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Mariposa soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 35 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Mariposa soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the available water capacity, maintaining the soil depth, and the hazard of erosion. Because soil depth varies, tree planting may be difficult and seedling survival may be low when the soil is shallow. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. The production of forage is transitory and limited by the amount of competition from conifers.

168 - Mariposa gravelly silt loam, 30 to 50 percent slopes.

This shallow to moderately deep and well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer- Pine series typically occurs on this unit. Elevation is 3,200 to 5,200 feet. The average annual precipitation is 50 to 60 inches.

Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is reddish yellow gravelly silty clay loam about 25 inches thick. Highly fractured and uptilted metasedimentary rock is at a depth of 30 inches. In some areas the surface layer is loam.

Included in this unit are small areas of Sites soils and Lithic Xerumbrepts. Also included are small areas of rock outcrop. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Mariposa soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 35 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Mariposa soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low available water capacity, the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Because the soil depth varies, tree planting may be difficult and seedling survival may be low when the soil is shallow. This soil is suited to only limited use as summer range because of steep slopes.

169 - Mariposa-Jocal complex, 5 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer - Pine series typically occurs on this unit. Elevation is 2,500 to 5,500 feet. The average annual precipitation is 45 to 60 inches.

This unit is 50 percent Mariposa gravelly silt loam and 40 percent Jocal loam. The percentage may vary from one area to another.

Included in this unit are small areas of Hartless, Mieruf, Neuns, and Sites soils, and rock outcrop. Also included are small areas of soils similar to Mariposa and Jocal that have greater than 35 percent rock fragments in the subsoil. Included areas make up about 10 percent of the total acreage.

The Mariposa soil is shallow to moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is reddish yellow gravelly silty clay loam about 25 inches thick. Highly fractured and uptilted metasedimentary rock is at a depth of 30 inches. In some areas the surface layer is loam.

Permeability of the Mariposa soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 35 inches. The maximum erosion hazard is moderate.

The Jocal soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low subsoil strength, the low available water capacity, maintaining the soil depth, and the hazard of erosion. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Because soil depth varies, tree planting may be difficult and seedling survival may be low where the soil is shallow. The production of forage is tansitory and limited by the amount of competition from conifers.

170 - Mariposa-Jocal complex, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 2,500 to 5,500 feet. The average annual precipitation is 45 to 60 inches.

This unit is 55 percent Mariposa gravelly silt loam and 30 percent Jocal loam. The percentage may vary from one area to another.

Included in this unit are small areas of Hartless, Mieruf, Neuns, and Sites soils, and rock outcrop. Also included are small areas of soils similar to Mariposa and Jocal that have greater than 35 percent rock fragments. Included areas make up about 15 percent of the total acreage.

The Mariposa soil is shallow to moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is reddish yellow gravelly silty clay loam about 25 inches thick. Highly fractured and uptilted metasedimentary rock is at a depth of 30 inches. In some areas the surface layer is loam.

Permeability of the Mariposa soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 35 inches. The maximum erosion hazard is high.

The Jocal soil is deep or very deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the upper 4 inches of the surface layer is brown loam. The lower part is strong brown silt loam about 11 inches thick. The subsoil is reddish yellow silty clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is reddish yellow sandy clay loam. In some areas the surface layer is gravelly loam.

Permeability of the Jocal soil is moderately slow. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep and very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Because soil depth varies, tree planting may be difficult and seedling survival may be low when the soil is shallow. Restricted use of ground based equipment under wet soil conditions may be necessary because of the low subsoil strength. Unsurfaced roads are soft and slippery when wet and can be impassible during rainy periods. This unit is suited to only limited use as summer range because of steep and very steep slopes.

171 - Mariposa-Maymen complex, 2 to 30 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on the Mariposa component of this unit. The Canyon Live Oak series typically occurs on the Maymen component of this unit. Elevation is 2,500 to 5,500 feet. The average annual precipitation is 45 to 60 inches.

This unit is 50 percent Mariposa gravelly silt loam and 30 percent Maymen gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Jocal, Hartless, and Neuns soils and rock outcrop. Also included are small areas of colluvial soils similar to Maymen that have greater than 35 percent rock fragments in the subsoil. Included areas make up about 20 percent of the total acreage.

The Mariposa soil is shallow to moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is reddish yellow gravelly silty clay loam about 25 inches thick. Highly fractured and uptilted metasedimentary rock is at a depth of 30 inches. In some areas the surface layer is loam.

Permeability of the Mariposa soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 35 inches. The maximum erosion hazard is moderate.

The Maymen soil is shallow and somewhat excessively drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The subsoil is light brown gravelly loam about 9 inches thick. Partly fractured and uptilted metasedimentary rock is at a depth of 13 inches. In some areas the surface layer is sandy loam.

Permeability of the Maymen soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them seperately. This unit is used mainly for timber production. It is also used for summer range.

Much of this unit is poorly suited to the production of timber because of the shallow Maymen soils. The Mariposa soil is suited to the production of timber. The culumination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth, the low available water capacity, and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Potential surface runoff from Maymen soil areas may require modifications in skid trail layout, erosion control measures and ground cover requirements to prevent erosion from concentrated flows. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Because soil depth varies, tree planting may be difficult and seedling survival may be low when the soil is shallow. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce surface degradation and to improve visibility. The production of forage is transitory and limited by the amount of competition from conifers.

172 - Mariposa-Maymen complex, 30 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on the Mariposa component of this unit. The Canyon Live Oak series typically occurs on the Maymen component of this unit. Elevation is 2,500 to 5,500 feet. The average annual precipitation is 45 to 60 inches.

This unit is 40 percent Mariposa gravelly silt loam and 40 percent Maymen gravelly loam. The percentage may vary from one area to another.

Included in this unit are small areas of Jocal, Hartless, and Neuns soils and rock outcrop. Also included are small areas of colluvial soils similar to Maymen that have greater than 35 percent rock fragments in the subsoil. Included areas make up about 20 percent of the total acreage.

The Mariposa soil is shallow to moderately deep and well drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is strong brown gravelly silt loam about 5 inches thick. The subsoil is reddish yellow gravelly silty clay loam about 25 inches thick. Highly fractured and uptilted metasedimentary rock is at a depth of 30 inches. In some areas the surface layer is loam.

Permeability of the Mariposa soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 35 inches. The maximum erosion hazard is high.

The Maymen soil is shallow and somewhat excessively drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The subsoil is light brown gravelly loam about 9 inches thick. Partly fractured and uptilted metasedimentary rock is at a depth of 13 inches. In some areas the surface layer is sandy loam.

Permeability of the Maymen soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them seperately. This unit is used mainly for timber production. It is also used for summer range.

Much of this unit is poorly suited to the production of timber because of the shallow Maymen soils . The Mariposa soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep and very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Potential surface runoff from Maymen soil areas may require modications in skid trail layout, erosion control measures,and ground cover requirements to prevent erosion from concentrated flows. Cable yarding system are suited to this unit because they protect the surface soil from excessive disturbances. The use of ground base equipment for site preparation is not practical because of the the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Because soil depth varies, tree planting may be difficult and seedling survival may be low when the soil is shallow. This unit is suited to only limited use as summer range because of the steep and very steep slopes.

173 - Maymen-Rock outcrop association, 30 to 75 percent slopes.

This map unit is on mountainsides. The Canyon Live Oak series typically occurs on this unit. Elevation is 2,500 to 5,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 50 percent Maymen gravelly loam and 30 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Mariposa soils and Neuns soils. Included areas make up about 20 percent of the total acreage.

The Maymen soil is shallow and somewhat excessively drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The subsoil is light brown gravelly loam about 9 inches thick. Partly fractured and uptilted metasedimentary rock is at a depth of 13 inches. In some areas the surface layer is sandy loam.

Permeability of the Maymen soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is high.

Rock outcrop occurs as scattered areas of metasedimentary rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

Most of this unit is poorly suited to the production of timber because of the shallow soils and rock outcrop. The Maymen soil is poorly suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from less than 20 to 49 cubic feet per acre for ponderosa pine. Areas of rock outcrop can reduce yield by about 30 percent. The main concerns in producing and harvesting timber on this unit are the steep and very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. The use of ground based equipment for site preparation is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. This unit is suited to only limited use as summer range because of steep and very steep slopes.

174 - Maymen-Rock outcrop association, 75 to 100 percent slopes.

This map unit is on mountainsides. The Canyon Live Oak series typically occurs on this unit. Elevation is 2,500 to 5,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 45 percent Maymen gravelly loam and 35 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Mariposa and Neuns soils. Included areas make up about 20 percent of the total acreage.

The Maymen soil is shallow and somewhat excessively drained. It formed in material weathered from metasedimentary rock. Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The subsoil is light brown gravelly loam about 9 inches thick. Partly fractured and uptilted metasedimentary rock is at a depth of 13 inches. In some areas the surface layer is sandy loam.

Permeability of the Maymen soil is moderate. Available water capacity is very low to low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is very high.

Rock outcrop occurs as scattered areas of metasedimentary rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

This unit is not suited to the production of timber or use as summer range.

175 - McCarthy gravelly sandy loam, 2 to 30 percent slopes.

This moderately deep, well drained soil is on mountainsides. It is formed in material weathered from andesitic lahar. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,600 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Included in this unit are small areas of Crozier and Ledmount soils. Also included are small areas of a soil similar to McCarthy that has less than 35 percent coarse fragments in the subsoil and a soil similar to McCarthy that is deeper than 40 inches. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The McCarthy soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth and potential erosion hazard. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

176 - McCarthy gravelly sandy loam, 30 to 50 percent slopes.

This moderately deep, well drained soil is on mountainsides. It is formed in material weathered from andesitic lahar. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 3,800 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Included in this unit are small areas of Crozier and Ledmount soils. Also included are small areas of a soil similar to McCarthy that has less than 35 percent coarse fragments in the subsoil and a soil similar to McCarthy that is deeper than 40 inches. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The McCarthy soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles and stones in the soil profile. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. This soil is suited to only limited use as summer range because of steep slopes.

177 - McCarthy-Ledmount association, 2 to 30 percent slopes.

This map unit is on tops and sides of volcanic tabular ridges. The Mixed Conifer-Pine series typically occurs on the McCarthy component of this unit. The Greenleaf Manzanita series typically occurs on the Ledmount component of this unit. Elevation is 4,000 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 60 percent McCarthy gravelly sandy loam and 30 percent Ledmount cobbly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Crozier soils and rock outcrop. Also included are small areas of a soil similar to Ledmount that is less than 10 inches deep. Also included are small areas of a soil similar to McCarthy that has less than 35 percent coarse fragments in the subsoil and a soil similar to McCarthy that is deeper than 40 inches. Included areas make up about 10 percent of the total acreage.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Ledmount soil is shallow and somewhat excessively drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark grayish brown and dark brown cobbly sandy loam about 15 inches thick over fractured, slightly weathered andesitic lahar.

Permeability of the Ledmount soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is moderate.

This unit is used for limited timber production. It is also used for summer range.

The McCarthy soil is suited to production of timber. The culumination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are maintaining the soil depth and the hazard of erosion. When these soils are situated in a position where water runoff concentrates from shallow soil areas, skid trail layout, erosion control measures, and ground cover requirements may need to be modified. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads requiremore than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

The Ledmount soil is not suited to production of timber. The highest growth rate on the Ledmount soil is less than 20 cubic feet per acre per year.

178 - McCarthy-Ledmount association, 30 to 75 percent slopes.

This map unit is on tops and sides of volcanic tabular ridges. The Mixed Conifer-Pine series typically occurs on the McCarthy component of this unit. The Greenleaf Manzanita series typically occurs on the Ledmount component of this unit. Elevation is 4,000 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 55 percent McCarthy gravelly sandy loam and 35 percent Ledmount cobbly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Crozier soils and rock outcrop. Also included are small areas of a soil similar to Ledmount that is less than 10 inches deep. Also included are small areas of a soil similar to McCarthy that has less than 35 percent coarse fragments in the subsoil and a soil similar to McCarthy that is deeper than 40 inches. Included areas make up about 10 percent of the total acreage.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is brown gravelly sandy loam about 5 inches thick. The subsoil is brown very gravelly loam about 21 inches thick. Weathered andesitic lahar is at a depth of 26 inches. In some areas the surface layer is gravelly loam.

Permeability of the McCarthy soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The Ledmount soil is shallow and somewhat excessively drained. It formed in material weathered from andesitic lahar. Typically, the surface layer is dark grayish brown and dark brown cobbly sandy loam about 15 inches thick over fractured, slightly weathered andesitic lahar.

Permeability of the Ledmount soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is high.

This unit is used for limited timber production. It is also used for summer range.

The McCarthy soil is suited to production of timber. The culumination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep and very steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles and stones in the soil profile. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. This soil is suited to only limited use as summer range because of steep and very steep slopes.

The Ledmount soil is not suited to the production of timber. The highest growth rate on the Ledmount soil is less than 20 cubic feet per acre per year.

179 - McCarthy-Rock outcrop complex, 15 to 75 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 45 to 60 inches.

This unit is 65 percent McCarthy gravelly loam and 25 percent rock outcrop. The percentage may vary from one area to another.
Included in this unit are small areas of Ledmount soils. Included areas make up about 10 percent of the total acreage.

The McCarthy soil is moderately deep and well drained. It formed in material weathered from rhyolite. Typically, the surface layer is brown gravelly loam about 11 inches thick. The subsoil is brown very cobbly loam about 13 inches thick. Slightly weathered and fractured rhyolitic tuff is at a depth of 24 inches.

Permeability of the McCarthy soil is moderately rapid. Available water holding capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is high.

Rock outcrop consists of rhyolitic tuff breccia. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on soils downslope, which increase the erosion hazard of the soil.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used for timber production. It is also used for summer range.

Much of this unit is not suited to production of timber because of the areas of rock outcrop. The McCarthy soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Potential surface runoff from rock outcrop areas may require modification in skid trail layout, erosion control measures and ground cover requirements to prevent erosion from concentrated flows. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Following road construction and timber harvest activities, road failures and landslides may occur. This unit is suited to only limited use as summer range because of steep and very steep slopes.

180 - Mieruf very gravelly loam, 5 to 30 percent slopes.

This deep, well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 55 to 60 inches.

Typically, the surface layer is dark brown very gravelly loam about 6 inches thick. The upper 19 inches of the subsoil is brown and reddish yellow gravelly loam. The lower 25 inches is reddish yellow loam. Weathered, fractured metasedimentary rock is at a depth of 50 inches. In some areas the surface layer is gravelly sandy loam.

Included in this unit are small areas of Hartless, Jocal, Neuns soils and Lithic Xerumbrepts. Also included is a soil similar to Mieruf that is 20 to 40 inches deep and a soil similar to Mieruf with a dark surface. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Mieruf soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

This soil is used mainly for timber production. It is also used for summer range.

The Mieruf soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concern in producing and harvesting timber on this soil is the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competion from conifers.

181 Mieruf very gravelly loam, 30 to 50 percent slopes.

This deep, well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 55 to 60 inches.

Typically, the surface layer is dark brown very gravelly loam about 6 inches thick. The upper 19 inches of the subsoil is brown and reddish yellow gravelly loam. The lower 25 inches is reddish yellow loam. Weathered, fractured metasedimentary rock is at a depth of 50 inches. In some areas the surface layer is gravelly sandy loam.

Included in this unit are small areas of Hartless, Jocal, Neuns soils and Lithic Xerumbrepts. Also included is a soil similar to Mieruf that is 20 to 40 inches deep and a soil similar to Mieruf with a dark surface. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Mieruf soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Mieruf soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This soil is suited to only limited use as summer range because of steep slopes.

182 - Neuns gravelly loam, 15 to 30 percent slopes.

This moderately deep, well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer- Pine series typically occurs on this unit. Elevation is 4,200 to 6,000 feet. The average annual precipitation is 55 to 60 inches.

Typically, the upper 3 inches of the surface layer is yellowish brown gravelly loam. The lower 9 inches is strong brown very cobbly sandy loam. The subsoil is reddish yellow very cobbly sandy loam about 22 inches thick. Hard, fractured metasedimentary rock is at a depth of 34 inches.

Included in this unit are small areas of Jocal, Mariposa, Mieruf soils, Lithic Xerumbrepts, and rock outcrop. Also included are small areas of a soil similar to Hartless that has an increase of clay in the subsoil. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Neuns soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Neuns soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth, the low available water capacity, and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. The production of forage is transitory and limited by the amount of competion from conifers.

183 - Neuns gravelly loam, 30 to 50 percent slopes.

This moderately deep, well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer- Pine series typically occurs on this unit. Elevation is 4,200 to 6,000 feet. The average annual precipitation is 55 to 60 inches.

Typically, the upper 3 inches of the surface layer is yellowish brown gravelly loam. The lower 9 inches is strong brown very cobbly sandy loam. The subsoil is reddish yellow very cobbly sandy loam about 22 inches thick. Hard, fractured metasedimentary rock is at a depth of 34 inches.

Included in this unit are small areas of Jocal, Mariposa, and Mieruf soils, Lithic Xerumbrepts, and rock outcrop. Also included are small area of a soil similar to Hartless that has an increase of clay in the subsoil. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Neuns soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Neuns soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for mixed conifers. The main concerns in producing and harvesting timber on this soil are the low available water capacity, maintaining the soil depth, the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layer. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling surival on south and southwest facing slopes. This soil is suited to only limited use as summer range because of steep slopes.

184 - Neuns gravelly loam, 50 to 75 percent slopes.

This moderately deep, well drained soil is on mountainsides. It formed in material weathered from metasedimentary rock. The Mixed Conifer- Pine series typically occurs on this unit. Elevation is 4,200 to 6,000 feet. The average annual precipitation is 55 to 60 inches.

Typically, the upper 3 inches of the surface layer is yellowish brown gravelly loam. The lower 9 inches is strong brown very cobbly sandy loam. The subsoil is reddish yellow very cobbly sandy loam about 22 inches thick. Hard, fractured metasedimentary rock is at a depth of 34 inches.

Included in this unit are small areas of Mariposa soils, Lithic Xerumbrepts, and rock outcrop. Also included are small areas of a soil similar to Hartless that has an increase of clay in the subsoil. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Neuns soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Neuns soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for mixed conifers. The main concerns in producing and harvesting timber on this soil are the very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Cable yarding system are suited to this soil because they protect the surface soil from excessive disturbances. The use of ground base equipment for site prepartion is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. This soil is suited to only limited use as summer range because of very steep slopes.

185 - Neuns-Lithic Xerumbrepts-Rock outcrop association, 50 to 100 percent slopes.

This map unit is in canyons. The Mountain Whitethorn series typically occurs on this unit. Elevation is 2,400 to 4,000 feet. The average annual precipitation is 50 to 60 inches.

This unit is 40 percent Neuns gravelly loam, 30 percent Lithic Xerumbrepts and 20 percent Rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Hartless and Mieruf soils. Included areas make up about 10 percent of the total acreage.

The Neuns soil is moderately deep and well drained. It formed in material weathered from metasedimentary rock. The Neuns component is on slopes of 50 to 80 percent. Typically, the upper 3 inches of the surface layer is yellowish brown gravelly loam. The lower 9 inches is strong brown very cobbly sandy loam. The subsoil is reddish yellow very cobbly sandy loam about 22 inches thick. Hard, fractured metasedimentary rock is at a depth of 34 inches.

Permeability of the Neuns soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The Lithic Xerumbrepts is shallow and excessively drained. It formed in material weathered from metamorphic rock. The Lithic Xerumbrepts component is on slopes of 50 to 100 percent. It has dark colors throughout the profile. Textures are sand, loamy sand, sandy loam, fine sandy loam, or loam with 5 to 65 percent rock fragments.

Permeability of the Lithic Xerumbrepts is moderately rapid or rapid. Available water capacity (AWC) is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is very high.

Rock outcrop occurs as isolated outcroppings and massive exposures of granitic or metamorphic rock. Runoff is very rapid. Large quanities of water may concentrate of soils downslope, which increases the erosion hazard of the soils.

This unit is used for limited timber production.

Most of this unit is not suited to the production of timber because of the shallow Lithic Xerumbrepts and areas of rock outcrop. The Nuens soil is suited to production of timber. The culumination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for mixed conifers. The main concerns in producing and harvesting timber on this soil are the very steep and extremely steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When these soils are situated in position where water runoff concentrates from shallow soils and rock outcrop, skid trail layout, erosion control measures, and ground cover requirements may need to be modified. Cable yarding system are suited to this soil because they protect the surface soil from excessive disturbances. The use of ground base equipment for site prepartion is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. This unit is not suited to use as summer range because of the very steep and extremely steep slopes.

186 - Neuns-Mieruf Complex, 30 to 50 percent slopes.

This map unit is on mountainsides. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 50 to 65 inches.

This unit is 50 percent Neuns gravelly loam and 30 percent Mieruf very gravelly silt loam. The percentage may vary from one area to another.

Included in this unit are small areas of Hartless, and Mariposa soils, Lithic Xerumbrepts, and rock outcrop. Also included is a soil similar to Mieruf that is 20 to 40 inches deep and a soil similar to Hartless that has a dark surface horizon. Included areas make up about 20 percent of the total acreage.

The Neuns soil is moderately deep and well drained. It formed in material weathered from metasedimentary rock. The upper 3 inches of the surface layer is yellowish brown gravelly loam. The lower 9 inches is strong brown very cobbly sandy loam. The subsoil is reddish yellow very cobbly sandy loam about 22 inches thick. Hard, fractured metasedimentary rock is at a depth of 34 inches.

Permeability of the Neuns soil is moderate. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The Mieruf soil is deep and well drained. It formed in material weathered from metasedimentary rock. Typically the surface layer is dark brown very gravelly loam about 6 inches thick. The upper 19 inches of the subsoil is brown and reddish yellow gravelly loam. The lower 25 inches is reddish yellow loam. Weathered, fractured metasedimentary rock is at a depth of 50 inches. In some areas the surface layer is gravelly sandy loam.

Permeability of the Mieruf soil is moderate. Available water capacity is moderate to high. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for mixed conifer. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survial on south and southwest facing slopes. This unit is suited to only limited use as summer range because of steep slopes.

187 - Notned-Gerle complex, 30 to 50 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,600 to 6,000 feet. The average annual precipitation is 55 to 60 inches.

This unit is 45 percent Notned bouldery coarse sandy loam and 30 percent Gerle sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Dome, Dome Variant, Ledford, Pilliken, Tallac, and Zeibright soils and Lithic Xerumbrepts. Also included are small areas of rock outcrop. Included areas make up about 25 percent of the total acreage.

The Notned soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 4 inches of the surface layer is dark brown bouldery coarse sandy loam. The lower 12 inches is dark yellowish brown cobbly coarse sandy loam. The subsoil is brown and yellowish brown very cobbly coarse sandy loam about 30 inches thick. The substratum to a depth of 62 inches is brownish yellow, very pale brown, and yellow very cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or commonly loamy sand.

Permeability of the Notned soil is moderately rapid. Available water capacity is low. Effective rooting depth is greater than 60 inches. The maximum erosion hazard is high.

The Gerle soil is very deep and well drained. It formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. Typically, the surface layer is dark brown and dark yellowish brown sandy loam about 12 inches thick. The subsoil is yellowish brown and light yellowish brown sandy loam about 18 inches thick. The upper 11 inches of the substratum is yellowish brown sandy loam. The lower part to a depth of 62 inches is yellowish brown cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or gravelly sandy loam.

Permeability of the Gerle soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is greater than 60 inches. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas ma

188 - Notned-Ledford association, 5 to 30 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 55 to 70 inches.

This unit is 55 percent Notned bouldery coarse sandy loam and 35 percent Ledford sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of a soil similar to Ledford that has a thin surface horizon. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

The Notned soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 4 inches of the surface layer is dark brown bouldery coarse sandy loam. The lower 12 inches is dark yellowish brown cobbly coarse sandy loam. The subsoil is brown and yellowish brown very cobbly coarse sandy loam about 30 inches thick. The substratum to a depth of 62 inches is brownish yellow, very pale brown, and yellow very cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or loamy sand.

Permeability of the Notned soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

The Ledford soil is deep and somewhat excessively drained. It formed in material weathered from granitic rock. Typically, the upper 2 inches of the surface layer is dark brown sandy loam. The lower part is dark brown and brown coarse sandy loam about 10 inches thick. The subsoil is yellowish brown coarse sandy loam about 25 inches thick. The substratum is light yellowish brown coarse sandy loam about 10 inches thick. Highly weathered granite is at a depth of 47 inches.

Permeability of the Ledford soil is rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Notned soil is suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

The Ledford soil is suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concern in producing and harvesting timber on this soil is potential erosion hazard. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition to conifer production.

189 - Notned-Ledford association, 30 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 55 to 70 inches.

This unit is 60 percent Notned bouldery coarse sandy loam and 30 percent Ledford sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of a soil similar to Ledford that has a thin surface horizon. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

The Notned soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 4 inches of the surface layer is dark brown bouldery coarse sandy loam. The lower 12 inches is dark yellowish brown cobbly coarse sandy loam. The subsoil is brown and yellowish brown very cobbly coarse sandy loam about 30 inches thick. The substratum to a depth of 62 inches is brownish yellow, very pale brown, and yellow very cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or loamy sand.

Permeability of the Notned soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

The Ledford soil is deep and somewhat excessively drained. It formed in material weathered from granitic rock. Typically, the upper 2 inches of the surface layer is dark brown sandy loam. The lower part is dark brown and brown coarse sandy loam about 10 inches thick. The subsoil is yellowish brown coarse sandy loam about 25 inches thick. The substratum is light yellowish brown coarse sandy loam about 10 inches thick. Highly weathered granitic rock is at a depth of 47 inches.

Permeability of the Ledford soil is rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Notned soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the low available water capacity, the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This soil is suited to only limited use as summer range because of steep slopes.

The Ledford soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 224 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Steep yarding paths, skid trails, and fire breaks are subject to rill an

190 - Notned-Rock outcrop association, 5 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 7,000 to 8,500 feet. The average annual precipitation is 55 to 70 inches.

This unit is 55 percent Notned bouldery coarse sandy loam and 30 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Gerle, Ledford soils and Lithic Xerumbrepts. Included areas make up about 15 percent of the total acreage.

The Notned soil is very deep and well drained. It formed in material weathered from granitic rock. Typically, the upper 4 inches of the surface layer is dark brown bouldery coarse sandy loam. The lower 12 inches is dark yellowish brown cobbly coarse sandy loam. The subsoil is brown and yellowish brown very cobbly coarse sandy loam about 30 inches thick. The substratum to a depth of 62 inches is brownish yellow, very pale brown, and yellow very cobbly coarse sandy loam. In some areas the surface layer is coarse sandy loam or loamy sand.

Permeability of the Notned soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. The maximum erosion hazard is high.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is very rapid. Large quanities of water may concentrate on soils downslope, which increase the erosion hazard of the soils.

This unit is used mainly for timber production. It is also used for summer range.

Much of this unit is not suited to the production of timber because of the areas of rock outcrop. The Notned soil is suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the presence of Rock outcrop, the low available water capacity, the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. Rock outcrop on the surface hinders harvesting operations and can cause breakage of timber when felled. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This soil is suited to only limited use as summer range because of steep slopes.

191 - Orthents-Rock outcrop association, 10 to 40 percent slopes.

This map unit is on mountainsides. The Mountain Hemlock series typically occurs on this unit. Elevation is 6,400 to 8,800 feet. The average annual precipitation is 45 to 55 inches.

This unit is 60 percent Orthents and 15 percent rock outcrop. The percentage may vary from one area to another.

Included in this map unit are small areas of Cryumbrepts and Xerumbrepts. Included areas make up 25 percent of the total acreage.

The Orthents are shallow or moderately deep and well drained. It formed in material weathered from granitic rock. Textures are loamy sand, coarse sandy loam, or sandy loam with 0 to 60 percent rock fragments.

Permeability of the Orthents are moderate or rapid. Available water capacity is very low. Effective rooting depth is 15 to 40 inches. The maximum erosion hazard is moderate.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

The Orthents are used mainly for recreation and summer range. The main concerns in management on this soil are the steep slopes and the hazard of erosion. This soil is poorly suited to the production of timber because of its isolated location in or adjacent to wilderness areas.

192 - Pilliken coarse sandy loam, 5 to 30 percent slopes.

This deep and well drained soil is on mountainsides. It formed from material weathered from granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 5,200 to 5,500 feet. The average annual precipitation is 55 to 60 inches.

Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Included in this unit are small areas of Bighill, Chaix, Dome, Ledford, and Zeibright soils and Lithic Xerumbrepts. Also included are small areas of rock outcrop and a soil similar to Pilliken that has a light colored surface horizon. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Pilliken soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 164 cubic feet per acre for ponderosa pine. The main concern in producing and harvesting timber on this unit is the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The production of forage is transitory and limited by the amount of competition from conifers.

193 - Pilliken coarse sandy loam, 30 to 50 percent slopes.

This deep and well drained soil is on mountainsides. It formed from material weathered from granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,000 to 6,000 feet. The average annual precipitation is 55 to 60 inches.

Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Included in this unit are small areas of Bighill, Chaix, Dome, Ledford, and Zeibright soils and Lithic Xerumbrepts. Also included are small areas of rock outcrop and a soil similar to Pilliken that has a light colored surface horizon. Included areas make up about 30 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is high.

This soil is used mainly for timber production. It is also used for summer range.

The Pilliken soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. This soil is suited to only limited use as summer range because of steep slopes.

194 - Pilliken-Rock outcrop complex, 5 to 30 percent slopes.

This map unit is on mountainsides and ridgetops. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 5,200 to 5,600 feet. The average annual precipitation is 55 to 60 inches.

This unit is 50 percent Pilliken coarse sandy loam and 25 percent Rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Chaix, Bighill, Dome, Ledford, and Zeibright soils and Lithic Xerumbrepts. Also included are small areas of a soil similar to Pilliken that has a light colored surface horizon and a soil similar to Pilliken that is loamy sand texture throughout. Included areas make up about 25 percent of the total acreage.

The Pilliken soil is deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is moderate.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

Much of this unit is not suited to the production of timber because of the areas of rock outcrop. The Pilliken soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the presence of Rock outcrop and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. Yarding paths, skid trails, and fire breaks are subject to rill and gully erosion unless protected by adequate water bars or ground cover. Potential surface runoff from rock outcrop areas may require modification in skid trail layout, erosion control measures, and ground cover requirements to prevent erosion from concentrated flows. Rock outcrop on the surface hinders harvesting operations and can cause breakage of timber when felled. The production of forage is transitory and limited by the amount of competition from conifers.

195 - Pilliken-Rock outcrop complex, 30 to 50 percent slopes.

This map unit is on mountainsides and ridgetops. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 5,200 to 5,600 feet. The average annual precipitation is 55 to 60 inches.

This unit is 50 percent Pilliken coarse sandy loam and 25 percent Rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Chaix, Bighill, Dome, Ledford, and Zeibright soils and Lithic Xerumbrepts. Also included are small areas of a soil similar to Pilliken that has a light colored surface horizon and a soil similar to Pilliken that is loamy sand texture throughout. Included areas make up about 25 percent of the total acreage.

The Pilliken soil is deep and well drained. It formed in material weathered from granitic rock. Typically, the surface layer is dark grayish brown, brown, and pale brown coarse sandy loam about 25 inches thick. The substratum is very pale brown gravelly coarse sandy loam about 33 inches thick. Highly weathered granitic rock is at a depth of 58 inches. In some areas the surface layer is sandy loam or loam.

Permeability of the Pilliken soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is high.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

Much of this unit is not suited to production of timber because of the areas of rock outcrop. The Pilliken soil is suited to the production of timber. The culmination mean annual increment (CMAI) is estimated to be from 120 to 164 cubic feet per acre for ponderosa pine. Areas of rock outcrop in this unit can reduce yield by about 25 percent. The main concerns in producing and harvesting timber on this unit are the steep slopes, the presences of Rock outcrop, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. Rock outcrop on the surface hinders harvesting operations and can cause breakage of timber when felled. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Yarding paths, skid trails, and fire breaks, are subject to rill and gully erosion unless protected by adequate water bars or ground cover. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This unit is suited to only limited use as summer range because of steep slopes.

196 - Pits, borrow

Pits are sand and gravel pits and rock quarries. They are typically barren. All vary in natural drainage, permeability, erosion hazard, runoff, and available water capacity.

197 - Riverwash

Riverwash occurs in and along channels of creeks and rivers. The material is highly stratified stony and bouldery sand that is typically barren. It is inundated yearly by floodwater. Riverwash is subject to scouring or cutting as well as to deposition, depending on riverflow and bedload.

Permeability is very rapid. The available water capacity and drainage are variable. Surface runoff is rapid. The hazard of erosion is very high.

Riverwash is used for watershed. It also provides good habitat for wildlife.

198 - Rock outcrop

Rock outcrop is exposed metamorphic rock, andesitic lahar, serpentine rock, or granitic rock formations which are highly resistant to weathering. The rock outcrops are mainly on steep to very steep slopes in major drainages. The andesitic lahar rock outcrop is found on the tops and sides of volcanic tabular ridges. At the higher elevations, it is generally associated with glaciated topography. At the lower elevations, it is generally associated with the Maymen, and Ledmount soils and Lithic Xerumbrepts.

These areas are essentially barren. The only plant cover is sparse grasses and browse and stunted trees.

199 - Rock outcrop-Cryumbrepts association, 15 to 75 percent slopes.

This map unit is on glaciated mountainsides. The rock outcrop is

barren. The Lodgepole Pine series typically occurs on the

Cryumbrepts component of this unit. Elevation is 6,500 to 9,500 feet. The average annual precipitation is 50 to 70 inches.

This unit is 50 percent rock outcrop and 30 percent Cryumbrepts. The percentage may vary from one area to another.

Included in this unit are small areas of Lithic Xerumbrepts and Xerumbrepts soils. Also included are small areas of Cryumbrepts, wet soils found along tributary drainages. Included areas make up about 20 percent of the total acreage.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

The Cryumbrepts soil is moderately deep, deep, or very deep and moderately well drained or well drained. It formed in glacially deposited material. The Cryumbrepts component is found on moraines, glacial till, and outwash terraces and alluvial plains. Typically, it has a dark surface and loamy sand, coarse sandy loam, or sandy loam textures throughout the profile with rock fragments ranging from 15 to 60 percent. In some areas the surface layer is stony or bouldery.

Permeability of the Cryumbrepts soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to over 60 inches thick to glacial till or outwash. The maximum erosion hazard is high.

The Cryumbrepts soil is used mainly for recreation and summer range. The main concerns in management on this soil are steep and very steep slopes and hazard of erosion. This soil is poorly suited to the production of timber because of its isolated location in or adjacent to wilderness areas.

200 - Rock outcrop-Tinker association, 15 to 75 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Huckleberry Oak series typically occurs on the Tinker component of this unit. Elevation is 6,000 to 7,200 feet. The average annual precipitation is 55 to 70 inches.

This unit is 65 percent rock outcrop and 20 percent Tinker very cobbly coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Cryumbrepts, wet, and Tallac soils. Also included are small areas of a soil similar to Tinker that has bedrock at a depth of less than 40 inches; a soil similar to Tinker that has a thin, dark surface horizon and a soil similar to Tinker that has loamy sand or sandy textures throughout. Included areas make up about 15 percent of the total acreage.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

The Tinker soil is moderately deep and moderately well drained or well drained. It formed in material weathered from glacial till composed primarily of granitic rock. Typically, the surface layer is grayish brown and brown very cobbly coarse sandy loam about 18 inches thick. The subsoil is light yellowish brown very cobbly coarse sandy loam about 12 inches thick. The upper 6 inches of the substratum is pale brown very cobbly coarse sandy loam. The lower part to a depth of 41 inches is light yellowish brown ahd light gray very cobbly sandy loam and is weakly cemented or compacted. In some areas the surface layer is stony sandy loam or cobbly sandy loam.

Permeability of the Tinker soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is high.

This unit is used for limited timber production. It is also used for summer range.

Most of this unit is poorly suited to the production of timber because of the areas of rock outcrop. The Tinker soil is poorly suited to production of timber. The culumination mean annual increment (CMAI) is estimated to be from 50 to 85 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are steep and very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Cable yarding system are suited to this soil because they protect the surface soil from excessive disturbances. The use of ground base equipment for site prepartion is not practical because of the steepness of slope. Rock outcrop on the surface hinders harvesting operations and can cause breakage of timber when felled. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. This unit is suited to only limited use as summer range because of the steep and very steep slopes.

201 - Tallac very cobbly sandy loam, 2 to 30 percent slopes.

This deep or very deep, moderately well drained soil is on lateral and terminal moraines and glacial outwash. It formed in material weathered from glacial deposits composed primarily of granitic rock. The Mixed Conifer-Fir series typically occurs on this unit. Elevation is 5,800 to 7,000 feet. The average annual precipitation is 55 to 70 inches.

Typically, the surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam, or gravelly sandy loam.

Included in this unit are small areas of Tinker soils, Lithic Xerumbrepts and rock outcrop. Also included are small areas of a soil similar to Tallac that is lacking a thick dark surface horizon. In a few areas slopes are greater than 30 percent. Included areas make up about 15 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Tallac soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for Red Fir. The main concerns in producing and harvesting timber on this soil are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragment in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

202 - Tallac very cobbly sandy loam, 15 to 30 percent slopes, stony.

This deep or very deep, moderately well drained soil is on lateral and terminal moraines. It formed in material weathered from glacial deposits composed primarily of granitic rock. The Huckleberry Oak series typically occurs on this unit. Elevation is 6,000 to 7,200 feet. The average annual precipitation is 55 to 70 inches.

Typically, stones cover 1 to 3 percent of the surface area. The surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Included in this unit are small areas of Notned and Tinker soils. Also included are small areas of rock outcrop. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Tallac soil is poorly suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 119 cubic feet per acre for Red Fir. The main concerns in producing and harvesting timber on this soil are the low available water capacity and the hazard of erosion. Stones on the surface hinder harvesting operations and can cause breakage of timber when felled. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capcity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

203 - Tallac-Cryumbrepts, wet association, 15 to 30 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Mixed Conifer-Fir series with small areas of the Sedge-Rush and Lodgepole Pine series typically occurs on this unit. Elevation is 6,000 to 7,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 60 percent Tallac very cobbly sandy loam and 30 percent Cryumbrepts, wet. The percentage may vary from one area to another.

Included in this unit are small areas of Gerle, Tinker, and Waca soils. Also included are small areas of a soil similar to Tallac that has sandy textures. Included areas make up about 10 percent of the total acreage.

The Tallac soil is deep or very deep and moderately well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The Cryumbrepts, wet is moderately deep, deep or very deep and somewhat poorly drained or poorly drained. It formed in mixed glacial alluvium. The Cryumbrepts, wet component is found in drainways and basins, and on flood plains. The surface horizon is dark with high organic matter. It is a highly variable soil with textures including loamy sand, sandy loam, loam, or silt loam with rock fragments ranging from 5 to 65 percent.

Permeability of the Cryumbrepts, wet is moderately rapid. Effective rooting depth is 20 to 40 inches thick, with a water table generally within 30 inches of the surface. The maximum erosion hazard is moderate.

This unit is used for timber production. It is also used for summer range.

Much of this unit is poorly sited to the production of timber because of the poorly drained Cryumbrepts, wet. The Tallac soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for Red Fir. The main concerns in producing and harvesting timber on this soil are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. Because the rooting depth is restricted by a seasonal water table in areas adjacent to Cryumbrept, wet areas, trees are occasionally subject to windthrow when the soil is wet and the winds are strong. The production of forage is transitory and limited by the amount of competition from conifers.

The Cryumbrepts, wet is used mainly for summer range and wildlife habitat. The main concerns in management on this soil are the presence of a water table and the seasonal flooding. Because of the presence of a high water table, harvest operations on adjacent areas must be carefully planned to avoid ground equipment operations on this soil. This soil is not suited to production of timber. Grazing should be delayed until the soil has drained and is firm enough to withstand tramping by livestock.

204 - Tallac Variant-Lithic Xerumbrepts-Rock outcrop complex, 15 to 50 percent slopes

This map unit is on mountainsides. The Huckleberry Oak series typically occurs on this unit. Elevation is 5,800 to 7,800 feet. The average annual precipitation is 55 to 70.

This unit is 35 percent Tallac Variant gravelly fine sandy loam, 30 percent Lithic Xerumbrepts, and 20 percent Rock outcrop. The percentage may vary from one area to another.

Included in this map unit are small areas of Hangtown, Smokey, and Tinker soils. Also included are small areas of rubbleland. Included areas make up about 15 percent of the total acreage.

The Tallac Variant soil is moderately deep and well drained. It formed in material weathered from metasedimentary rocks. Typically, the upper 3 inches of the surface layer is dark brown gravelly fine sandy loam. The lower 20 inches is dark brown and brown very gravelly fine sandy loam. The upper 11 inches of the substratum is yellowish brown very cobbly fine sandy loam. The lower 4 inches is very stony sandy loam. Fractured metasedimentary rock is at a depth of 38 inches. In some areas the surface layer is very gravelly fine sandy loam or very gravelly loam.

Permeability of the Tallac Variant soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Lithic Xerumbrepts is shallow and excessively drained. They formed in material weathered from metamorphic rock. They have dark colors throughout the profile. Textures are sandy loam, fine sandy loam, or loam with 5 to 65 percent rock fragments.

Permeability of the Lithic Xerumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. The maximum erosion hazard is high.

Rock outcrop occurs as scattered areas of metasedimentary rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase the erosion hazard on downslope soils.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used for limited timber production. It is also used for summer range.

Most of this unit is poorly suited to the production of timber because of the shallow Lithic Xerumbrepts and areas of rock outcrop. The Tallac Variant soil is poorly suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 20 to 84 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth, the low available water capacity, the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads require additional dust abatement during dry periods to reduce road surface degradation and to improve visibility. This unit is suited to only limited use as summer range because of steep slopes.

205 - Tinker very cobbly coarse sandy loam, 30 to 75 percent slopes.

This moderately deep, moderately well drained or well drained soil is on lateral and terminal moraines and glacial outwash. It formed in material weathered from glacial till composed primarily of granitic rock. The Huckleberry Oak series typically occurs on this unit. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 55 to 70 inches.

Typically, the surface layer is grayish brown and brown very cobbly coarse sandy loam about 18 inches thick. The subsoil is light yellowish brown very cobbly coarse sandy loam about 12 inches thick. The upper 6 inches of the substratum is pale brown very cobbly coarse sandy loam. The lower part to a depth of 41 inches is light yellowish brown and light gray very cobbly sandy loam and is weakly cemented or compacted. In some areas the surface layer is stony sandy loam or cobbly sandy loam.

Included in this unit are small areas of Tallac soils and rock outcrop. Also included are small areas of a soil similar to Tinker that has a light colored surface horizon or a thick dark surface horizon. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Tinker soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Tinker soil is poorly suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are steep and very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Cable yarding system are suited to this soil because they protect the surface soil from excessive disturbances. The use of ground base equipment for site preparation is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragment in the surface layer in some areas makes planting seedlings difficult. This soil is suited to only limited use as summer range because of the steep and very steep slopes.

206 - Tinker-Cryumbrepts, wet-Rock outcrop association, 2 to 30 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Lodgepole Pine series typically occurs on the Tinker component of this unit. The Willow series typically occurs on the Cryumbrepts, wet component. Elevation is 6,500 to 9,500 feet. The average annual precipitation is 55 to 65 inches.

This unit is 40 percent Tinker very cobbly coarse sandy loam, 25 percent Cryumbrepts, wet, and 20 percent rock outcrop. The percent may vary from one area to another.

Included in this unit are small areas of Tallac soils and Lithic Xerumbrepts. Also included are small areas of a soil similar to Tinker that has a light colored surface. Included areas make up about 15 percent of the total acreage.

The Tinker soil is moderately deep and moderately well drained or well drained. It formed in material weathered from glacial till composed primarily of granitic rock. Typically, the surface layer is grayish brown and brown very cobbly coarse sandy loam about 18 inches thick. The subsoil is light yellowish brown very cobbly coarse sandy loam about 12 inches thick. The upper 6 inches of the substratum is pale brown very cobbly coarse sandy loam. The lower part to a depth of 41 inches is light yellowish brown ahd light gray very cobbly sandy loam and is weakly cemented or compacted. In some areas the surface layer is stony sandy loam or cobbly sandy loam.

Permeability of the Tinker soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is moderate.

The Cryumbrepts, wet soil is moderately deep, deep, or very deep and somewhat poorly drained or poorly drained. It formed in mixed glacial alluvium. The Cryumbrepts, wet component is found in drainways and basins, and on flood plains on slopes of 5 to 30 percent. The surface horizon is dark with high organic matter. It is a highly variable soil with textures including loamy sand, sandy loam, loam, or silt loam with rock fragments ranging from 0 to 65 percent.

Permeability of the Cryumbrepts, wet is moderately rapid. Effective rooting depth is 20 to 40 inches thick, with a water table generally within 30 inches of the surface. The maximum erosion hazard is high.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase the erosion hazard on downslope soils.

This unit is used for limited timber production. It is also used for summer range.

Most of this unit is poorly suited to the production of timber because of the Cryumbrepts, wet and areas of rock outcrop. The Tinker soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the low available water capacity, the seasonal water table, maintaining the soil depth, and the hazard of erosion. Because the rooting depth is restricted by a seasonally high water table, trees are occasionally subject to windthrow when the soil is wet and the winds are strong. When these soils are situated in a position where water runoff concentrates from rock outcrop or shallow soils, skid trail layout, erosion control measures, and ground cover requirements may need to be modified. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. This soil is suited to only limited use as summer range on the steeper slopes.

The Cryumbrepts, wet is used mainly for summer range and wildlife habitat. The main concerns in management on this soil are the presence of a water table and seasonal flooding. This soil is not forested and is not suited to the production of timber. Because of its water table, harvest operations on adjacent areas must be carefully planned to avoid ground equipment operations on this soil. Grazing should be delayed until the soil has drained and is firm enough to withstand trampling by livestock.

207 - Tinker-Tallac complex, 50 to 75 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Huckleberry Oak or Mountain Whitethorn series typically occurs on the Tinker component of this unit. The Mixed Conifer-Fir series typically occurs on the Tallac component of this unit. Elevation is 5,400 to 7,000 feet. The average annual precipitation is 55 to 70 inches.

This unit is 50 percent Tinker very cobbly coarse sandy loam and 30 percent Tallac very cobbly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Gerle and Notned soils and rock outcrop. Also included are small areas of soils similar to Tallac and Tinker that have sandy textures. Included areas make up about 20 percent of the total acreage.

The Tinker soil is moderately deep and moderately well drained or well drained. It formed in material weathered from glacial till composed primarily of granitic rock. Typically, the surface layer is grayish brown and brown very cobbly coarse sandy loam about 18 inches thick. The subsoil is light yellowish brown very cobbly coarse sandy loam about 12 inches thick. The upper 6 inches of the substratum is pale brown very cobbly coarse sandy loam. The lower part to a depth of 41 inches is light yellowish brown ahd light gray very cobbly sandy loam and is weakly cemented or compacted. In some areas the surface layer is stony sandy loam or cobbly sandy loam.

Permeability of the Tinker soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is high.

The Tallac soil is deep or very deep and moderately well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. Cable yarding system are suited to this soil because they protect the surface soil from excessive disturbances. The use of ground based equipment for site prepartion is not practical because of the steepness of slope. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This unit is suited to only limited use as summer range because of the very steep slopes.

208 - Tinker-Tallac-Rock outcrop association, 5 to 30 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Huckleberry Oak or Mountain Whitethorn series typically occurs on the Tinker component of this unit. The Mixed Conifer-Fir series typically occurs on the Tallac component of this unit. Elevation is 5,500 to 7,500 feet. The average annual precipitation is 55 to 70 inches.

This unit is 35 percent Tinker very cobbly coarse sandy loam, 30 percent Tallac very cobbly sandy loam, and 20 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Gerle and Notned soils. Also included are small areas of a soil similar to Tinker that is shallow or moderately deep to rock and a soil similar to Tallac that has a sandy textures throughout. Included areas make up about 10 percent of the total acreage.

The Tinker soil is moderately deep and moderately well drained or well drained. It formed in material weathered from glacial till composed primarily of granitic rock. Typically, the surface layer is grayish brown and brown very cobbly coarse sandy loam about 18 inches thick. The subsoil is light yellowish brown very cobbly coarse sandy loam about 12 inches thick. The upper 6 inches of the substratum is pale brown very cobbly coarse sandy loam. The lower part to a depth of 41 inches is light yellowish brown ahd light gray very cobbly sandy loam and is weakly cemented or compacted. In some areas the surface layer is stony sandy loam or cobbly sandy loam.

Permeability of the Tinker soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is moderate.

The Tallac soil is deep or very deep and moderately well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. The surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Tinker soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the low available water capacity, maintaining the soil depth, and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

The Tallac soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for Red Fir. The main concerns in producing and harvesting timber on this soil are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

Rock outcrop hinders harvesting operations and can cause breakage of timber when felled. When rock outcrop concentrates water runoff on adjacent soils, skid trail layout, erosion control measures, and ground cover requirements may need to be modified.

209 - Tinker-Tallac-Rock outcrop association, 30 to 75 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Huckleberry Oak or Mountain Whitethorn series typically occurs on the Tinker component of this unit. The Mixed Conifer-Fir series typically occurs on the Tallac component of this unit. Elevation is 5,500 to 7,500 feet. The average annual precipitation is 55 to 70 inches.

This unit is 40 percent Tinker very cobbly coarse sandy loam, 30 percent Tallac very cobbly sandy loam, and 20 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Gerle and Notned soils. Also included are small areas of a soil similar to Tinker that is shallow or moderately deep to rock and a soil similar to Tallac that has a sandy textures throughout. Included areas make up about 10 percent of the total acreage.

The Tinker soil is moderately deep and moderately well drained or well drained. It formed in material weathered from glacial till composed primarily of granitic rock. Typically, the surface layer is grayish brown and brown very cobbly coarse sandy loam about 18 inches thick. The subsoil is light yellowish brown very cobbly coarse sandy loam about 12 inches thick. The upper 6 inches of the substratum is pale brown very cobbly coarse sandy loam. The lower part to a depth of 41 inches is light yellowish brown ahd light gray very cobbly sandy loam and is weakly cemented or compacted. In some areas the surface layer is stony sandy loam or cobbly sandy loam.

Permeability of the Tinker soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 21 to 40 inches. The maximum erosion hazard is high.

The Tallac soil is deep or very deep and moderately well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. The surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

This unit is used for timber production. It is also used for summer range.

The Tinker soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 50 to 119 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes, the hazard of erosion, the low available water capacity, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suited in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that and adequate ground cover remains to protect the soil surface. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. This soil is suited to only limited use as summer range because of the steep and very steep slopes.

The Tallac soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of

wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. This soil is suited to only limited use as summer range because of the steep and very steep slopes.

Rock outcrop hinders harvesting operations and can cause breakage of timber when felled. When rock outcrop concentrates water runoff on adjacent soils, skid trail layout, erosion control measures, and ground cover requirements may need to be modified.

210 - Umbrepts-Tallac-Gerle association, 15 to 30 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Sedge-Rush series typically occurs on the Umbrepts component of this unit. The Mixed Conifer-Fir series typically occurs on the Tallac and Gerle components. Elevation is 5,800 to 7,000 feet. The average annual precipitation is 55 to 65 inches.

This unit is 30 percent Umbrepts, 30 percent Tallac very cobbly sandy loam, and 30 percent Gerle coarse sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas of Notned and Tinker soils. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

Umbrepts are somewhat poorly drained or moderately well drained soils that formed in alluvial material along drainages and on glacial outwash. Typically, they have dark surface horizons. The profile has stratified layers with textures ranging from clays to loams with 50 to 70 percent rock fragments.

Permeability of the Umbrepts is slow or moderately slow. The maximum erosion hazard is moderate.

The Tallac soil is deep or very deep and moderately well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is very dark grayish brown, dark brown, and brown very cobbly sandy loam about 29 inches thick. The substratum to a depth of 61 inches is yellowish brown and light yellowish brown very gravelly sandy loam. In some areas the surface layer is gravelly coarse sandy loam, cobbly sandy loam or gravelly sandy loam.

Permeability of the Tallac soil is moderately rapid. Available water capacity is very low to low. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The Gerle soil is very deep and well drained. It formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. Typically, the surface layer is dark brown and dark yellowish brown coarse sandy loam about 12 inches thick. The subsoil is yellowish brown and light yellowish brown coarse sandy loam about 18 inches thick. The upper 11 inches of the substratum is yellowish brown coarse sandy loam. The lower part to a depth of 62 inches is yellowish brown cobbly coarse sandy loam. In some areas the surface is coarse sandy loam or gravelly sandy loam.

Permeability of the Gerle soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. The maximum erosion hazard is moderate.

This unit is used for limited timber production. It is also used for summer range.

The Umbrepts is well suited to use as summer range. The main concerns in range management on this unit are the hazard of seasonal flooding, the presence of a high seasonal water table, and the stability of stream bank. Because of the presence of a water table, harvest operations on adjacent areas must be carefully planned to avoid ground equipment operations on this soil. Grazing should be delayed until the soil has drained and is firm enough to withstand trampling by livestock.

The Tallac soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for Red Fir. The main concerns in producing and harvesting timber on this soil are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited to the amount of competition from conifers.

The Gerle soil is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil

surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seeding survival on south and southwest facing slopes. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited to the amount of competition from conifers.

211 - Waca cobbly sandy loam, 5 to 30 percent slopes.

This moderately deep, well drained soil is on mountainsides. It formed in material weathered from andesitic lahar. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 9,000 feet. The average annual precipitation is 55 to 70 inches.

Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Included in this unit are small areas of Lithic Cryumbrepts and Windy soils. Also included are small areas of rock outcrop. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. The effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Waca soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifer.

212 - Waca cobbly sandy loam, 30 to 50 percent slopes.

This moderately deep, well drained soil is on mountainsides. It formed in material weathered from andesitic lahar. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 9,000 feet. The average annual precipitation is 55 to 70 inches.

Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Included in this unit are small areas of Lithic Cryumbrepts and Windy soils. Also included are small areas of rock outcrop. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. The effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Waca soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This soil is suited to only limited use as summer range because of steep slopes.

213 - Waca-Lithic Cryumbrepts association, 30 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on the Waca component of this unit. The Mules Ears series typically occurs on the Lithic Cryumbrepts component. Elevation is 6,000 to 10,000 feet. The average annual precipitation is 60 to 80 inches.

This unit is 65 percent Waca cobbly sandy loam and 25 percent Lithic Cryumbrepts. The percentage may vary from one area to another.

Included in this unit are small areas of Windy soils. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

The Waca soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Lithic Cryumbrepts is shallow and excessively drained. It formed in material weathered from andesitic lahar. Typically, it is sandy loam, fine sandy loam, or loam with rock fragments ranging from 20 to 80 percent. The surface layer is dark, has low bulk density, and has some amorphous clay.

Permeability of the Lithic Cryumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Waca soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ref fir. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When these soils are situated in a position where water runoff concentrates from shallow soil or rock outcrop areas, skid trail layout, erosion control mesures, and ground cover requirements may need to be modified. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This unit is suited to only limited use as summer range because of steep slopes.

The Lithic Cryumbrepts soil is used mainly for recreation and summer range. The main concerns in management on this soil are steep slopes, high runoff potential, and potential erosion hazard. This soil is not forested and is not suited to the production of timber because of its shallow depth.

214 - Waca-Lithic Cryumbrepts-Cryumbrepts, wet association, 5 to 30 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on the Waca component of this unit, the Mules Ears series typically occurs on the Lithic Cryumbrepts component, and the Willow series typically occurs on the Cryumbrepts, wet component. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 45 to 65 inches.

This unit is 50 percent Waca cobbly sandy loam, 25 percent Lithic Cryumbrepts, and 15 percent Cryumbrepts, wet. The percentage may vary from one area to another.

Included in this unit are small areas of Windy soils. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

The Waca soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Lithic Cryumbrept is shallow and excessively drained. It formed in material weathered from andesitic lahar. Typically, it is sandy loam, fine sandy loam, or loam with rock fragments ranging from 20 to 80 percent. The surface layer is dark, has low bulk density, and has some amorphous clay.

Permeability of the Lithic Cryumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. The maximum erosion hazard is moderate.

The Cryumbrepts, wet is moderately deep or very deep and somewhat poorly drained or poorly drained. It formed in mixed glacial alluvium. The Cryumbrepts, wet component is found along drainages. Typically, the surface horizon is dark with high organic matter. It is a highly variable soil with textures including loamy sand, sandy loam, loam, or silt loam with rock fragments ranging from 5 to 65 percent.

Permeability of the Cryumbrepts, wet soil is moderately rapid. Effective rooting depth is 20 to 40 inches thick, with a water table generally within 30 inches of the surface. The maximum erosion hazard is moderate.

This unit is used for limited timber production. It is also used for summer range.

The Waca soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth and the hazard of erosion. When these soils are situated in a position where water runoff is concentrates from Lithic Cryumbrept soil areas, skid trail layout, erosin control measures and ground cover requirements may need to be modified. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

The Lithic Cryumbrepts soil is used mainly for recreation and summer range. The main concerns in management on this soil are steep slopes, high runoff potential, and potential erosion hazard. This soil is non-timbered and is not suited to the production of timber because of its shallow depth.

The Cryumbrepts, wet soil is used mainly for summer range and wildlife habitat. The main concerns in management on this soil are the presence of a water table and seasonal flooding. This soil is non-timbered and is not suited to the production of timber. Because of its water table, harvest operations on adjacent areas must be carefully planned to avoid ground equipment operations on this soil. Seasonal grazing use must be based on proper soil moisture conditions.

215 - Waca-Lithic Cryumbrepts-Cryumbrepts, wet association, 30 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on the Waca component of this unit, the Mules Ears series typically occurs on the Lithic Cryumbrepts component, and the Willow series typically occurs on the Cryumbrepts, wet component. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 45 to 65 inches.

This unit is 45 percent Waca cobbly sandy loam, 30 percent Lithic Cryumbrepts, and 15 percent Cryumbrepts, wet. The percentage may vary from one area to another.

Included in this unit are small areas of Windy soils. Also included are small areas of rock outcrop. Included areas make up about 10 percent of the total acreage.

The Waca soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is high.

The Lithic Cryumbrepts is shallow and excessively drained. It formed in material weathered from andesitic lahar. Typically, it is sandy loam, fine sandy loam, or loam with rock fragments ranging from 20 to 80 percent. The surface layer is dark, has low bulk density and has some amorphous clay.

Permeability of the Lithic Cryumbrepts is moderately rapid. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. The maximum erosion hazard is high.

The Cryumbrepts, wet is moderately deep or very deep and somewhat poorly to poorly drained. It formed in mixed glacial alluvium. The Cryumbrepts, wet component is found along drainages. Typically, the surface horizon is dark with high organic matter. It is a highly variable soil with textures including loamy sand, sandy loam, loam, or silt loam with rock fragments ranging from 5 to 65 percent.

Permeability of the Cryumbrepts, wet is moderately rapid. Effective rooting depth is 20 to 40 inches thick, with a water table generally within 30 inches of the surface. The maximum erosion hazard is moderate.

This unit is used for limited timber production. It is also used for summer range.

The Waca soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When these soils are situated in a position where water runoff concentrates from shallow soils areas, skid trail layout, erosion control measures, and ground cover requirements may need to be modified. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this unit for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This unit is suited to only limited use as summer range because of steep slopes.

The Lithic Cryumbrepts soil is used mainly for recreation and summer range. The main concerns in management on this soil are steep slopes, high runoff potential, and potential erosion hazard. This soil is non-timbered and is not suited to the production of timber because of its shallow depth.

The Cryumbrepts, wet soil is used mainly for summer range and wildlife habitat. The main concerns in management on this soil are the presence of a water table and seasonal flooding. This soil is non-timbered and is not suited to the production of timber. Because

of its water table, harvest operations on adjacent areas must be carefully planned to avoid ground equipment operations in these areas. Seasonal grazing use must be based on proper soil moisture conditions.

216 - Waca-Windy complex, 5 to 30 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 55 to 70 inches.

This unit is 50 percent Waca cobbly sandy loam and 40 percent Windy gravelly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas Cryumbrepts, wet, Lithic Cryumbrepts, and Tallac soils. Also included are small areas of soils similar to Waca and Windy that have less than 35 percent rock fragments in the subsoil. The included areas make up about 10 percent of the total acreage.

The Waca soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Windy soil is deep or very deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 7 inches of the surface layer is yellowish brown gravelly sandy loam. The lower 9 inches is dark brown and brown very cobbly sandy loam. The subsoil is dark brown and light yellowish brown extremely cobbly sandy loam about 30 inches thick. The substratum to a depth of 62 inches is pale brown extremely cobbly sandy loam.

Permeability of the Windy soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this unit are maintaining the soil depth and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

217 - Waca-Windy complex, 30 to 50 percent slopes.

This map unit is on mountainsides. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 55 to 70 inches.

This unit is 55 percent Waca cobbly sandy loam and 35 percent Windy gravelly sandy loam. The percentage may vary from one area to another.

Included in this unit are small areas Cryumbrepts, wet, Lithic Cryumbrepts, and Tallac soils. Also included are small areas of soils similar to Waca and Windy that have less than 35 percent rock fragments in the subsoil. The included areas make up about 10 percent of the total acreage.

The Waca soil is moderately deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 8 inches of the surface layer is dark grayish brown and dark brown cobbly sandy loam. The lower 19 inches is brown very cobbly sandy loam. Weathered andesitic lahar is at a depth of 27 inches. In some areas the surface layer is gravelly sandy loam or cobbly coarse sandy loam.

Permeability of the Waca soil is moderately rapid. Available water capacity is low. Effective rooting depth is 20 to 40 inches. The maximum erosion hazard is moderate.

The Windy soil is deep or very deep and well drained. It formed in material weathered from andesitic lahar. Typically, the upper 7 inches of the surface layer is yellowish brown gravelly sandy loam. The lower 9 inches is dark brown and brown very cobbly sandy loam. The subsoil is dark brown and light yellowish brown extremely cobbly sandy loam about 30 inches thick. The substratum to a depth of 62 inches is pale brown extremely cobbly sandy loam.

Permeability of the Windy soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

The components of this unit are so intricately intermingled that it is not practical to manage them separately. This unit is used mainly for timber production. It is also used for summer range.

This unit is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the steep slopes, the hazard of erosion, and maintaining the soil depth. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that site preparation methods do not remove any of the surface layers. An adequate ground cover must be retained to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This unit is suited to only limited use as summer range because of steep slopes.

218 - Windy gravelly sandy loam, 5 to 30 percent slopes.

This deep or very deep, well drained soil is on mountainsides. It formed in material weathered from andesitic lahar.The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 55 to 70 inches.

Typically, the upper 7 inches of the surface layer is yellowish brown gravelly sandy loam. The lower 9 inches is dark brown and brown very cobbly sandy loam. The subsoil is dark brown and light yellowish brown extremely cobbly sandy loam about 30 inches thick. The substratum to a depth of 62 inches is pale brown extremely cobbly sandy loam.

Included in this unit are small areas of Lithic Cryumbrepts, Tallac, and Waca soils. Included areas make up about 15 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Windy soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Windy soil is well suited to intensive production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concern in producing and harvesting timber on this unit is the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Unsurfaced logging roads require more than normal treatment for dust abatement during dry periods to reduce road surface degradation and to improve visibility. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

219 - Windy gravelly sandy loam, 30 to 50 percent slopes.

This deep or very deep, well drained soil is on mountainsides. It formed in material weathered from andesitic lahar. The Red Fir series typically occurs on this unit. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 55 to 70 inches.

Typically, the upper 7 inches of the surface layer is yellowish brown gravelly sandy loam. The lower 9 inches is dark brown and brown very cobbly sandy loam. The subsoil is dark brown and light yellowish brown extremely cobbly sandy loam about 30 inches thick. The substratum to a depth of 62 inches is pale brown extremely cobbly sandy loam.

Included in this unit are small areas of Lithic Cryumbrepts, Tallac, and Waca soils. Included areas make up about 20 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Windy soil is moderately rapid. Available water capacity is low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Windy soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for red fir. The main concerns in producing and harvesting timber on this soil are the steep slopes and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The high content of rock fragments in the surface layer in some areas ma

220 - Xerumbrepts-Cryumbrepts, wet association, 5 to 50 percent slopes.

This map unit is on moraines, outwash terraces, and alluvial plains. The Red Fir series typically occurs on the Xerumbrepts component of this unit. The Willow series typically occurs on the Cryumbrepts, wet component. Elevation is 6,000 to 9,000 feet. The average annual precipitation is 50 to 65 inches.

This unit is 55 percent Xerumbrepts and 15 percent Cryumbrepts, wet. The percentage may vary from one area to another.

Included in this unit are small areas of Cryumbrepts and Orthents soils. Also included are small areas of rock outcrop. Included areas make up about 30 percent of the total acreage.

The Xerumbrepts soil is moderately deep or deep and moderately well drained or well drained. It formed in glacially deposited material. The Xerumbrepts component is on moraines, glacial till and glacial out wash terraces. Typically, the surface is dark and 20 to 40 inches thick. Textures are loamy sand, coarse sandy loam, or sandy loam throughout the profile with 15 to 80 percent rock fragments.

Permeability of the Xerumbrepts is moderatedly rapid or rapid. Available water capacity is very low. Effective rooting depth is 20 to 60 inches. The maximum erosion hazard is high.

The Cryumbrepts, wet is moderately deep, deep, or very deep and somewhat poorly drained or poorly drained. It formed in glacial alluvium. The Cryumbrepts, wet component is on alluvial plans along drainages. Typically, the surface horizon is dark with high organic matter. It is a highly variable soil with textures including loamy sand, sandy loam, loam, or silt loam with rock fragments ranging from 5 to 65 percent.

Permeability of the Cryumbrepts, wet is moderately rapid. Effective rooting depth is 20 to 40 inches thick, with a water table generally within 30 inches of the surface. The maximum erosion hazard is high.

The Xerumbrepts soils are used mainly for recreation, summer range, and wildlife habitat. The main concerns in management on this soil are the steep slopes and the hazard of erosion. This soil is not available for the production of timber because of its isolated location in or adjacent to wilderness areas.

The Cryumbrepts, wet soil is used mainly for summer range and wildlife habitat. The main concerns in management on this soil are the presence of a water table and the hazard of seasonal flooding. This soil is not suited to the production of timber. Grazing should be delayed until the soil has drained and is firm enough to withstand trampling by livestock.

221 - Zeibright extremely gravelly coarse sandy loam, 2 to 30 percent slopes.

This deep or very deep, well drained soil is on lateral and terminal moraines and glacial outwash. It formed in material weathered from glacial deposits composed primarily of granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 40 to 65 inches.

Typically, the surface layer is dark grayish brown extremely gravelly coarse sandy loam about 10 inches thick. The upper 25 inches of the substratum is brown and light yellowish brown extremely cobbly coarse sandy loam. The lower part to a depth of 61 inches is brownish yellow and light yellowish brown very cobbly and extremely stony coarse sandy loam. In some areas the surface layer is gravelly sandy loam or cobbly sandy loam.

Included in this unit are small areas of Dome, Gerle, and Notned soils, Lithic Xerumbrepts, and rock outcrop. Also included are small area of a soil similar to Zeibright that has a thin, dark surface horizon. Included areas make up about 15 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Zeibright soil is moderately rapid. Available water capacity is very low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is moderate.

This unit is used mainly for timber production. It is also used for summer range.

The Zeibright soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this unit are the low available water capacity and the hazard of erosion. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. The production of forage is transitory and limited by the amount of competition from conifers.

222 - Zeibright extremely gravelly coarse sandy loam, 30 to 75 percent slopes.

This deep or very deep, well drained soil is on lateral and terminal moraines and glacial outwash. It formed in material weathered from glacial deposits composed primarily of granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 40 to 65 inches.

Typically, surface layer is dark grayish brown extremely gravelly coarse sandy loam about 10 inches thick. The upper 25 inches of the substratum is brown and light yellowish brown extremely cobbly coarse sandy loam. The lower part to a depth of 61 inches is brownish yellow and light yellowish brown very cobbly and extremely stony coarse sandy loam. In some areas the surface layer is gravelly sandy loam or cobbly sandy loam.

Included in this unit are small areas of Dome, Gerle, and Notned soils, Lithic Xerumbrepts, and rock outcrop. Also included are small area of a soil similar to Zeibright that has a thin, dark surface horizon. Included areas make up about 25 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Zeibright soil is moderately rapid. Available water capacity is very low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Zeibright soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. This soil is suited to only limited use as summer range because of steep and very steep slopes.

223 - Zeibright gravelly sandy loam, 15 to 50 percent slopes.

This deep or very deep, well drained soil is on lateral and terminal moraines and glacial outwash. It formed in material weathered from glacial deposits composed primarily of granitic rock. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 5,100 to 5,800 feet. The average annual precipitation is 55 to 70 inches.

Typically, the surface layer is very dark grayish brown and brown gravelly sandy loam about 23 inches thick. The underlying material to a depth of 61 inches is pale brown and light gray very gravelly coarse sandy loam.

Included in this unit are small areas of Dome, Gerle, Notned, and Tallac soils. Included areas make up about 15 percent of the total acreage. The percentage may vary from one area to another.

Permeability of the Zeibright soil is moderately rapid. Available water holding capacity is low to moderate. Effective rooting depth is 40 inches or more. The maximum erosion hazard is high.

This unit is used mainly for timber production. It is also used for summer range.

The Zeibright soil is suited to production of timber. The culmination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep slopes, and the hazard of erosion. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. This soil is suited to only limited use as summer range because of steep slopes.

224 - Zeibright-Rock outcrop association, 15-75 percent slopes.

This map unit is on lateral and terminal moraines and glacial outwash. The Mixed Conifer-Pine series typically occurs on this unit. Elevation is 4,800, to 6,200 feet. The average annual precipitation is 40 to 65 inches.

This unit is 60 percent Zeibright extremely gravelly coarse sandy loam and 30 percent rock outcrop. The percentage may vary from one area to another.

Included in this unit are small areas of Notned and Tallac soils. Also included are small areas of a soil similar to Zeibright that is moderately deep to rock or a cemented or compacted horizon. Included areas make up about 10 percent of the total acreage.

The Zeibright soil is deep or very deep and well drained. It formed in material weathered from glacial deposits composed primarily of granitic rock. Typically, the surface layer is dark grayish brown extremely gravelly coarse sandy loam about 10 inches thick. The upper 25 inches of the substratum is brown and light yellowish brown extremely cobbly coarse sandy loam. The lower part to a depth of 61 inches is brownish yellow and light yellowish brown very cobbly and extremely stony coarse sandy loam. In some areas the surface layer is gravelly sandy loam or cobbly sandy loam.

Permeability of the Zeibright soil is moderately rapid. Available water capacity is very low to moderate. Effective rooting depth is 40 to 60 inches or more. The maximum erosion hazard is high.

Rock outcrop is isolated and massive bodies of granitic rock. Runoff is rapid and large quanities of water can concentrate downslope and may increase erosion hazard on downslope soils.

This unit is used mainly for timber production. It is also used for summer range.

The Zeibright soil is suited to production of timber. The culumination mean annual increment (CMAI) is estimated to be from 85 to 164 cubic feet per acre for ponderosa pine. The main concerns in producing and harvesting timber on this soil are the steep and very steep slopes, the hazard of erosion, and the low available water capacity. Minimizing the risk of erosion is essential in harvesting timber and in reforestation efforts. When harvesting timber, the steepness of slope restricts the use of wheeled and tracked equipment in skidding operations. Cable yarding systems generally are more suitable in the steeper areas because they can prevent excessive disturbance of the surface soil. When preparing this soil for reforestation, the steepness of slope restricts the use of ground based equipment in piling operations. Reforestation efforts must be carefully planned and managed so that an adequate ground cover remains to protect the soil surface from erosion. The low available water capacity in the surface layer significantly reduces conifer seedling survival on south and southwest facing slopes. The high content of rock fragments in the surface layer in some areas makes planting seedlings difficult. Cut and fill slopes tend to ravel because of the high amounts of rounded pebbles, cobbles, and stones in the soil profile. This soil is suited to only limited use as summer range because of the steep and very steep slopes.

Rock outcrop hinders harvesting operations and can cause breakage of timber when felled. When rock outcrop concentrates water runoff on adjacent soils, skid trail layout, erosion control measures, and ground cover requirements may need to be modified.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Woodland Management and Productivity

Forests are one of the important resources of the survey area. They supply raw material for one of the major industries, provide recreation for many people, provide food and cover for many forms of wildlife, protect watersheds, and form the backdrop for much of the outdoor beauty. Approximately 314,870 acres, or 50 percent of the total area, is capable of supporting commercial forests.

Commercial conifers grow mainly on specific kinds of soils. The most widespread species of commercial conifers is ponderosa pine. Others of commercial importance are sugar pine, Jeffery pine, white fir, incense cedar, Douglas fir, and red fir.

Black oak grows throughout the survey area on soils suited to commercial conifers and often in association with them. Several other noncommercial species of oak grow in the area including interior live oak and cayon live oak. Willow, alders, and hardwoods, such as bigleaf maple and dogwood, grow along streams.

Table 2 can be used by forest managers or woodland owners in planning the use of soils for wood crops. Only those soils suitable for wood crops are rated. In table 2 the soils are rated for a number of factors to be considered in management. Slight, moderate, and severe are used to indicate the degree of major soil limitations.

Soil manageability: The ease of managing land depends on the kinds and intensities of cultivation and harvest techniques. It is also dependent on soil and topographic features, although the importance of these features is related to the type of management system. Soil manageability classificaton rates soils and their topography on the basis of features which reduce the ease of equipment operation and increase required soil protection measures for most systems, particularly those commonly practiced in forestry and intensive range management.

The soil manageability classes are based on soil and topographic features and are applied to the individual soils of a map unit. Soils are classified on the basis of ease of equipment operation and need for soil protection measures. They are designated by arabic numerals and may have management modifiers designated by letters.

Class 1 - Easy to manage. Soils in this class are on stable slopes of less than 30 percent. They are moderately deep or deep and do not have any more than slight management problems. Management modifiers are not applied to this class.

Class 2 - Readily mangeable. Soils in this class are on slopes of less than 30 percent, and have a moderate management modifier (designated by lowercase letters), such as moderate erosion potential.

Class 3 - Moderately difficult to manage. Soils in this class are on steep slopes (30 to 50 percent), or have a substantial management modifier (designated by uppercase letters), or both.

Class 4 - Very difficult to manage. Soils in this class are on very steep slopes (greater than 50 percent) and have more than one substantial management modifier.

The management modifiers are:

"S" - if the slope stability is low and "s" if it is moderate.
"E" - if the maximum erosion hazard is high or very high and "e" if it is moderate.
"D" - if the soil depth is less than 10 inches and "d" if it is 10 to 20 inches.
"P" - if the upper 20 inches of soil has an available water capacity of less than 1.2 inches and "p" if it is 1.2 to 2.4 inches.
"W" - if the soil is poorly drained and "w" if it is somewhat poorly drained.
"X" - if cobbles or stones comprise greater than 15 percent of the surface and "x" if they comprise 3 to 15 percent of the surface.

Land management planners dealing with Forests and larger areas may not be concerned with every soil taxonomic unit, or individual components of soil map units. They generally want to avoid the complications of having more than one soil manageability symbol for a delineation or a soil map unit. Therefore, soil manageability groups have been developed for utilization in broad planning. The groups rate soil map units and only one group applies to a map unit, whereas soil manageability classes rate soil map unit components and as many classes may apply to a map unit as there are major components in the soil map unit.

Soil manageability groups: The groups are ratings for the map unit and are determined by the soil manageability classes which were applied to the map unit components. They are designated by Roman numerals in order to distinguish them from soil manageability class symbols, which are designated by Arabic numerals. A soil map unit is always placed in the group with the lowest numeral in cases where the group definitions would allow it to be in more than one soil manageability group.

Group IA - Class 1 components predominate with less than 30 percent class 2, and less than 10 percent classes 3 and 4 components.

Group I - Class 1 components predominate, with less than 50 percent class 2, less than 20 percent class 3, and less than 10 percent class 4 components by area.

Group II - Class 2 components predominate with less than 50 percent class 3 components and less than 20 percent class 4 components by area.

Group III - Class 3 components predominate, with less than 40 percent class 4 components by area.

Group IV - Class 4 components predominate, or occupy at least 40 percent of the map unit area.

Management group modifiers where assigned to each group based on the folowing criteria:

E Components rated E make up at least 50 percent of the map unit.
e Components rated e make up at least 50 percent of the map unit.

X Rock outcrop makes up at least 40 percent of the map unit, or if components rated X make up at least 40 percent of the map unit, or if Rock outcrop plus the components rated X make up at least 40 percent of the unit.
x Rock outcrop makes up 10 to 39 percent of the map unit, or if Rock outcrop plus the components rated X make up 10 to 39 percent of the unit.

W Components rated W make up at least 50 percent of the map unit.
w Components rated w make up at least 10 percent of the map unit and the percentage is greater than the percentage rated X.

D Components rated D make up at least 40 percent of the map unit.
d Components rated d make up at least 40 percent of the map unit.

P Components rated P make up at least 40 percent of the map unit, or if components rated P plus D make up at least 40 percent of the map unit.
p Component rated p make up at least 40 percent of the map unit, or if components rated p plus d make up at least 40 percent of the map unit.

G Slope gradient in the map unit is greater than 50 percent.
g Slope gradient in the map unit is 30 to 50 percent.

Forest Survey Site Class: The productivity of timber land is expressed in board feet or volume of bole wood produced on a unit area of land. Volume is the preferred unit of measure and productivity classes have been defined for the Forest Survey Site Classes. The yield of normal evenage stands at culmination of mean annual increment are given for each class in cubic feet per acre.

1	more than 225
2	165 to 225
3	120 to 165
4	85 to 120
5	50 to 85
6	20 to 50
7	less than 20

The yield is not volume of wood produced in any one year, but the average over a stand rotation period that maximizes the yeild.

The measurement of timber yield is a time consuming job, seldom done on fully stocked stands as required to compile yield tables. Once yield tables are compiled, the potential yield can be estimated from the timber site index, or tree height-age relationships. This procedures assumes "normal" stocking. Yield tables for California trees and the corresponding Forest Survey Site Classes are tabulated in "Field Instruction for Integrated Forest Survey and Timber Management Inventories in Oregon, Washington, and California." Since that publication may not be readily available to all soil scientist, a table of site indices and corresponding Forest Survey Site Classes has been placed in the Appendix. The table contains generalizations from yield tables and, in the case of the Dunning (1942) site indices, for which there are no yield tables, approximations.

Use caution in converting site index to yield, because some soils are not capable of growing trees at the normal stand densities. There is generally no great problem for the better timber producing soils; for example, those of Dunning site index 135 to 140 and higher. However, some poorer timber producing soils are only capable of supporting open stands of conifer trees. For soils incapable of supporting normal stands of conifer timber, the volume from the yield tables should be reduced in the proportion that the density, or basal area, of a completely stocked stand is less than that of a normally stocked stand.

Equipment limitations: Ratings of equipment limitations reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Soil wetness has an influence on the type of equipment and time of use. Soils are usually too wet for the extensive use of ground yarding systems between November and April. Soil compaction by wheeled or tracked equipment can be a problem on all soils when they are wet except for sandy or very gravelly soils. Restricted use of ground based equipment may be necessary under excessively wet ground conditions. Roads are frequently impassible during the rainy season except where they are rocked or where they are on very gravelly or sandy soils. The depth of the snowpack limits access and equipment use at elevations above 4,500 feet from December through April. Some soils, such as McCarthy, Cohasset, Jocal, and others are dusty when dry. More than normal amounts of watering, oiling, or other road surface and dust control treatments may be desirable on these soils during periods of heavy use under dry conditions.

Steepness of slope is an important consideration when selecting harvesting and site prepartion equipment or systems. Slope gradients of less than 30 percent present few limitations to wheeled and tracked equipment. On slopes of 30 to 50 percent, more care is needed in choosing equipment suited to the site. Cable yarding systems generally cause the least soil disturbance where the terrain and road systems are suitable to their use. However, where existing skid trails and haul roads can be used, or where short, steep slopes are intermixed with flat areas, tractor yarding equipment can be used with minimal soil disturbance. Large areas with slope gradients over 50 percent are generally better suited for cable yarding system because it causes less soil disturbance.

Seedling mortality: Rating of seedling mortality indicates the degree to which the soil affects the mortality of tree seedlings growing on a south aspect. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A south aspect is used to determine the rating because this aspect normally has the highest mortality due to temperature and moisture stresses. Ratings are normally lower for the other aspects. A rating of *slight* indicates that no problem is expected under normal conditions; *moderate* indicates that extra precautions are advisable; and *severe* indicates that precautions are important and replanting may be necessary.

Soil properties that commonly influence seedling mortality include texture, amounts of rock fragments, temperature, and drainage. Soils with available water capacities (AWC) of less than 2.5 inches in the upper 24 inches of the soil cause severe limitations for seedlings, especially on south and west facing slopes below 6,000 feet. Low available water capacity is less critical at the higher elevations where the potential plant water use is generally less. Species selection, type of planting stock, compe-

tition from undesirable plants, type of site preparation, and the available water capacity and rock fragment content of the soil need to be considered when reforesting soils in this area.

Susceptibility to damage: Rating the *susceptibility to damage from fire* is intended to be used as a general guideline when planning either prescribed burns or revegetation after wildfires. Soil damage can sometimes occur from burning. The risk of damage increases with the intensity of heat. The damage is mainly related to the loss of organic matter. Some soils have characteristics which enable them to withstand this loss better than other soils. These characteristics are used to rate the soils for their susceptibility to damage from burning. A rating of *slight* indicates that most types of fire will not have an adverse effect on soil characteristics and future productivity; *moderate*, that some extra care is needed in planning to maintain favorable soil characteristics; and *severe*, that special attention is needed to protect soil organic matter in order to maintain productivity. The rating system is intended to be used as a general guideline.

Rating the *susceptibility to damage from soil displacement* indicates the tendency of a soil to be adversely affected by equipment or other traffic when the soil is dry. Soil displacement can result in sheared or damaged roots and a reduction in plant productivity, or its potential. The ratings of slight, moderate, and severe are indended to be used as a general guideline.

A rating of *revegetating exposed subsoil* indicates the degree of difficulty in revegetating exposed subsoil. Subsoil horizons are frequently exposed during forest management activities. This occurs on road cuts and fills, and on some skid roads. Land managers may desire to revegetate these areas. Characteristics of the subsoil which influence planting conditions, germination, and subsequent growth rate are considered in the ratings. These are general ratings; they do not preclude the need for on-site investigation of individual projects.

A rating of *slight* indicates there are few problems with revegetation. If locally adapted grasses are properly seeded, a good stand can be expected to reduce surface erosion. If trees are planted, good survival and growth can be expected. Natural revegetation will be better on these subsoils than on those with moderate or severe ratings. *Moderate* indicates that additional care is needed in choosing methods or types of plants for erosion control. If trees are planted, some mortality can be expected and growth rates will be below those on undistrubed areas. *Severe* indicates that intensive and expensive measures would be needed to establish erosion control plants. Some soils with a severe rating have little need for erosion control plantings because the exposed areas have large amounts of hard rock with only a small amount of erodible soils. Tree planting would be very difficult, survival would be low, or growth rates would be very slow or greatly reduced below those of undisturbed areas. On site evaluation is essential when considering revegetation on severe sites.

Maximum Erosion Hazard: Many land use activities have the potential to cause erosion rates to exceed natural soil erosion or soil formation rates. Potential consequences of accelerated erosion include reductions in the productive capacity of the soil and adverse effects on water quality. Many interrelated factors are evaluated in an EHR system to determine whether land use activities would cause accelerated erosion, and to what degree accelerated erosion would cause adverse effects. It is designed to appraise the relative risk of accelerated sheet and rill erosion. The system does not rate gully erosion, dry ravel, wind erosion, or mass wasting.

The adjective erosion hazard ratings are described below in terms of the likelihood and consequences of accelerated erosion. As the risk of accelerated erosion increases, so does the likelihood that accelerated erosion will exceed soil formation rates. The risk and consequence becomes especially critical for shallow and moderately deep soils over consolidated materials.

The maximum EHR are based on little or no vegetative cover present and on the long-term average occurrence of 2-year, 6-hour storm events. Erosion hazard risks are greater when storm frequency, intensity and/or duration exceed long-term average occurrence, and risks are less when occurrence is below "average". The risks and consequences for adjective erosion hazard ratings are described below.

Low EHR. Accelerated erosion is not likely to occur, except in the upper part of the Low EHR numerical range, or during periods of above average storm occurrence. If accelerated erosion does occur, adverse effects on soil productivity and to nearby water quality are not expected. Erosion control measures are usually not needed for these areas.

Moderate EHR. Accelerated erosion is likely to occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality may occur for the upper part of the Moderate EHR numerical range, or during periods of above average storm occurrence. The need for erosion control should be evaluated for these areas. A wide selection of measures and application methods are available.

High EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality are likely to occur, especially during periods of above average storm occurrence. Erosion control is necessary for these areas to prevent accelerated erosion. The selection of measures and methods of application are somewhat limited.

Very high EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity and to nearby water quality are very likely to occur, even during periods of below average storm occurrence. Erosion control is essential for these areas to prevent accelerated erosion. The selection of measures and methods of application are limited.

Recreation

The soils of the survey area are rated in table 3 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 3, the degree of soil limitation is expressed as slight, moderate, or severe. Slight means that soil properties are generally favorable and that limitations are minor and easily overcome. Moderate Means that limitations can be overcome or alleviated by planning, design, or special maintenance. Severe means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 3 can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in table 3.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Construction Materials

Table 4 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated good, fair, or poor as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability

within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated good contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated fair are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated poor have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 4, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Top soil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated good have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated fair are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated poor are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory

to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 5 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials and the Unified soil classification system.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 5.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 6 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption yields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are low, a change of less than 3 percent; moderate, 3 to 6 percent; and high, more than 6 percent. Very high, greater than 9 percent, is sometime used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (up to 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 6, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning plant residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 7 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A - Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B - Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C - Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 7 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. None means that flooding is not probable; rare that it is unlikely but possible under unusual weather conditions; common that it is likely under normal conditions; occasional that it occurs, on the average, no more than once in 2 years; and frequent that it occurs, on the average, more than once in 2 years. Duration is expressed as very brief if less than 2 days, brief if 2 to 7 days, and long if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data in less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 6 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings

and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as low, moderate, or high, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as low, moderate, or high. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (10). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 8 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in sol. An example is Inceptisols.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Umbrept (Umbr, meaning presence of a umbric epipedon, plus ept, from Inceptisols).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the neame of a suborder and by a prefix that indicates a property of the soil. An example is Xerumbrepts (Xer, meaning dry, plus umbrepts, the suborder of the Inceptisols that have an umbric epipedon).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective Typic identifies the subgroup that typifies the great group. An example is Typic Xerumbrepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, mesic Typic Xerumbrepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil recognized in the survey area is described. The descriptions are arranged in alphabetical order.

Characteristics of the soil and the material in which it formed are identified. A pedon, a small three-dimensional area of soil, that is typical of the soil in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (10). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soil.

The map units of each soil are described in the section "Detailed soil map units".

Table 2 lists the area of each soil and map unit component, and identifies its proportionate extent of the survey area.

Formation of the Soils

The definition of the word soil varies depending on the discipline concerned. To an engineer, soil is regolith or any unconsolidated material, regardless of depth or mode of formation. To the pedologist or soil scientist, soil is the collection of natural bodies on the earth's surface, containing living matter that supports or is capable of supporting plants (13). It is a mixture of varying proportions of rocks and minerals, elements combined as salts or as ions, organic matter, water, and air.

The processes involved in soil formation are complex, and the soil is constantly changing. Five genetic and environmental factors interact to form soil. They are (1) parent material; (2) the climate in which the soil material accumulated and has existed since accumulation; (3) the relief, or topography, which influences the local or internal environment of the soil, its drainage, moisture content, aeration, susceptibility to erosion, and exposure to sun and wind; (4) biological forces that act upon the soil material, such as the plants and animals living on and in it; and (5) the length of time the climatic and biological forces have acted on the soil material.

These factors form a soil that differs from the material from which it is derived in many physical, chemical, and biological characteristics.

Relief

Relief through its effect on drainage and erosion has had an important influence on soil development in the survey area. The deeply entrenched streams in the mountainous areas flow westward. The deep canyons are V-shaped. The remnant ridges of andesite lahars are tabular and slope slightly to the west. The areas of metamorphic rocks are complex and steep. Many narrow ridges that lie in a northwesterly direction have dendritic drainage patterns. The areas of granodiorite are smooth and rounded. Some appear to be in a basin because they are rimmed by more resistant metamorphic rocks. There are a few alluvial bottoms and terraces along present day and Tertiary streams. Most of these areas have been mined for gold.

The aspect, or the direction a slope faces, is also important in determining where some soils will form. For examples, Maymen soil forms on the warm south- and west-facing slopes and Jocal soil on the cooler north- and east-facing slopes.

Parent Material

Parent material is one of the strongest influences on the formation of the upland soils in the survey area. Most soils in the uplands formed in place over metamorphic rock, granitic rock, or andesitic lahars.

Metamorphic rocks generally are not easily weathered. They usually form shallow gravelly soils that contain many rock outcrops. The metamorphic rocks are fine grained and form soils with loam and silt loam surface textures. Some of these soils are not high in fertility, probably because the sediments from which these rocks formed were previously weathered in an earlier erosion cycle. For example, Jocal soils are not so fertile as the adjacent Cohasset soils, which formed in material weathered from andesitic lahars. The Shoo Fly complex is folded so that they are vertically tilted. The bedding planes of the metasedimentary schists and slates are exposed at the surface of these formations. The variability in composition of this stratification is reflected in the variation of soils within short horizontal distances. The depth and other soil characteristics change rapidly. Examples are Mariposa, Jocal, and Sites soils.

The soils formed over andestic lahars are Aiken and Cohasset. The andesitic lahar is deeply weathered, especially in Aiken soil, because this material is porous and weathers easily. The andesite is moderately fine grained and forms soils with loam and sandy loam surface textures. When the parent rock is welded tuff breccia, the rock is hard, massive, and non-porous and shows only slight signs of weathering. The shallow Ledmount soils formed on this parent material.

Soils underlain by granitic rocks occupy places where the overlying rocks were stripped away and the Sierra Nevada batholith was exposed. Here are the Chaix, Pilliken, and Lumberly soils. The parent rock is weathered to a considerable depth, and the soils are 2 to 5 feet deep. The weathered rocks contain many angular coarse grains of sand, mainly quartz, which form soils with coarse sandy loam surface texture. The abrasive action of the grains of sand carried by runoff water accounts for the susceptibility of these soils to erosion. The rounded landscape and the depth of the soils indicate that geologic erosion is also relatively rapid.

The relationship of parent material to soil patterns is shown on the general soil map at the back of this survey. The major difference between the groups of map units is the parent material. Many of the soil boundaries are closely related to the boundaries between different geologic formations.

Climate

Climate has a marked influence on soil formation. Heat and moisture strongly influence the kind and amount of vegetation that grows, the rate at which organic matter decomposes, the rate at which organic matter decomposes, the rate at which minerals weather, the removal of material from some soil horizons, and the accumulation of material in other soil horizons.

Temperature and precipitation in the survey area vary according to elevation. In the western part of the area, the precipitation is about 45 inches, and the mean annual temperature is about 55 degrees F. The precipitation increases and the temperature decreases regularly with increasing elevation. At an elevation of 9,000 feet, the annual precipitation is about 70 inches and the mean annual temperature is about 39 degrees F. Above 5,000 feet, much of the precipitation falls as snow.

Summer in this area is hot and dry. Winter is cool and moist. There is no appreciable summer rainfall except for a few thundershowers in the mountains. Significant rainfall generally starts early in fall, reaches a maximum in midwinter, and stops late in spring.

The content of organic matter in the soils is high where the climate is cool and moist. At elevations of more than 5,500 feet, growth is not so rapid as at lower elevations because of the cool temperature and a short growing season. Nevertheless, the soils are high in organic matter because the roots of plants are generally coarse and cool temperatures do not favor rapid decomposition. At intermediate elevations, the soils have a moderate amount of organic matter, even though decomposition is rapid. Rainfall is abundant and temperatures are moderate. Vegetation is abundant and large amounts of plant residue are returned to the soil.

Rainfall in the survey area is sufficient to leach all the soils. Surplus water is available in the soil during the wet season. The surplus water is retained by the soil, percolates through it, or is lost through runoff. Surface runoff, however, does not cause a major loss of water in the area. Evidences of leaching are the absence of lime in soil profiles, the presence of clay films at considerable depths in many of the soils or in the weathered rock, and the constant or decreasing pH with increasing depth of the soils.

Between elevations of about 2,000 and 5,000 feet, the soils appear to undergo the most intensive weathering because they are still moist when they warm in summer. In general, the soils at these elevations have a thicker profile and a redder, finer textured Bt horizon than soils at higher or lower elevations. Examples are Aiken and Sites soils. On the other hand, the cooler temperatures at the higher elevations along the eastern boundary of the survey area also limit the chemical reactions required for weathering.

Biological Activity

The vegetation in the survey area consists of mainly coniferous forest. The pattern of vegetation has been affected somewhat by fires, grazing practices, clearing, and timber harvest.

The soils formed under coniferous forest have a mat of litter and duff 1/2 inch to more than 6 inches thick. Such material is acid and contributes to the acidity of the soils. The roots of the trees follow cracks and fracture planes in the parent rock and help break up the rocks. Roots in the upper 2 or 3 feet of the soil make up more than 20 percent of the total volume in places. Their growth and decomposition make the soil more porous. Aiken and Sites soils formed under forest where the carbon-nitrogen ratio exceeds 20.

Burning also has influenced the soils in many ways. Man and lightning are the main causes of fires. Repeated burning depletes the organic matter and thus influences the characteristics of the surface soil. Fire changes plant ecology, and different plan communities result. Thus, one of the soil-forming factors is altered.

Time

In the upland soils, the geologic age of the parent rock does not necessarily relate to the age of the soils. None of these soils shows signs of maturity. Because of the natural slope, geologic erosion progresses at about the same rate as the soils form.

The oldest soils are those in relatively undissected areas. The youngest are those on narrow steep divides, on very steep slopes, or on other sites subject to erosion. Aiken soils, which developed on remnants of the volcanic plain as tabular ridges, are considered to be the oldest soils. Other soil materials were exposed after the volcanic plain was dissected or stripped away by erosion. Consequently, these soils are younger. Examples of the sequence of soil development in the survey area can be

illustrated by Maymen, Mariposa, Jocal, and Sites soils. Maymen soils, on narrow ridge crests or adjacent steep slopes, are very shallow to shallow over hard bedrock and do not have a Bt horizon. Mariposa soils, on broader divides and less erodible side slopes than Maymen soils, are shallow to moderately deep and have a weak B2t horizon. Jocal soils, on long stable slopes or on lower gently sloping divides, are deep and have a distinct Bt horizon of clay loam. Sites soils, in the most stable positions on the landscape, have a Bt horizon of red clay. Some of the differences in the formation of these soils, however, may be related to the fact that the stratified parent rock weathers readily.

Morphology of the Soils

Because the influence of the soil-forming factors varies greatly within the survey area, many different kinds of soils have formed. Many soils in the area have several prominent horizons, some have only one horizon, and others have several weak, or indistinct, horizons. Soils with prominent horizons can occur adjacent to those with less distinct horizons. The processes that have had the greatest influence in forming the different soil horizons are (1) weathering of parent materials, (2) accumulation of organic matter, (3) formation and translocation of clays, (4) influence of iron oxides, and (5) translocation of silica.

Some of the distinguishing features of the soils formed over bedrock are related to the degree of weathering of the parent material. For example, where weathering has been slight, the soils have few horizons and usually have distinguishing features that come from their parent material. The slightly weathered Maymen soils, for example, have thin, indistinct horizons. Their pale color, gravelly loam texture, and medium acid reaction are related to the underlying slate. As weathering increases, differences in horizons are less directly related to the parent material but are products of alteration. The deep Aiken soils have a red, fine textured subsoil, and their horizons contrast strongly with the underlying brownish yellow andesitic conglomerate.

In all soils of the survey area, enough organic matter has accumulated on the surface to form an A1 horizon, which ranges from a thin, faint light colored horizon to a thick, conspicuous dark colored horizon. Aiken soils have a thick, dark A1 horizon that is about 6 percent organic matter in the upper 15 inches.

The translocation of silicate clay minerals is a feature of many soils in the area. The clay films on ped faces and in root channels, as well as colloidal bridges between the sand grains, indicate the movement of clay minerals from the A horizon to the Bt horizon. McCarthy soils have little or no translocated clay. Aiken soils have large amounts of translocated clay. The Bt horizon is at least 15 percent more clay than the A horizon within a vertical distance of 1 inch. Evidence of clay movement is the many moderately thick continuous clay films in the Bt horizon.

Iron affects the color of many soils. In well drained soils, iron is oxidized and produces yellow and red colors. Where the iron has been translocated in the profile, the colors are more intense. Aiken and Sites soils are examples. The translocation of iron is greatest in soils at elevations of 2,000 to 4,500 feet. Here, the temperature favors a high degree of weathering and considerable water percolates through the soil. Forest litter on the surface produces organic acids that help to release iron for downward migration. This increase is indicated in the redder color of the Bt horizon in such soils as Aiken and Sites. The reduction of iron, which is not an important process in the area but does occur in poorly drained soils, such as Aquepts, accounts for the black, gray, and blue-green colors, or the gleying.

AIKEN SERIES

The Aiken series consists of very deep, well drained soils formed in material weathered from andesitic lahar. These soils are on the tops and sides of volcanic tabular ridges. Slope ranges from 2 to 30 percent. Vegetation is the Mixed Conifer-Pine series. Elevation ranges from 3,000 to 5,000 feet. The mean annual precipitation is 50 to 60 inches, some of which falls as snow.

These soils are clayey, oxidic, mesic Xeric Haplohumults.

Typical pedon of Aiken loam is from a unit of Aiken-Cohasset loams, 2 to 30 percent slopes located 35 miles northeast of Georgetown, in the SE1/4NW 1/4 of section 21, T. 13 N., R. 12 E., Tunnel Hill quadrangle.

O–2 to 0 inches; decomposed leaf litter and duff.

A1–0 to 6 inches; brown (7.5YR 4/4) loam, dark brown (7.5YR 3/2) moist; strong very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots, few fine and medium roots; many very fine, fine, and medium interstitial pores; medium acid; gradual smooth boundary.

A2–6 to 16 inches; brown (7.5YR 4/4) loam, dark brown (7.5YR 3/2) moist; moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots, few medium and coarse roots; common very fine, fine, and medium interstitial pores; medium acid; gradual smooth boundary.

BAt1–16 to 24 inches; yellowish red (5YR 4/6) clay loam, dark reddish brown (2.5YR 3/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few medium and coarse roots; common very fine, fine, and medium tubular pores; many thin clay films lining pores; medium acid; gradual wavy boundary.

BAt2–24 to 36 inches; yellowish red (5YR 4/6) clay loam, dark red (2.5YR 3/6) moist; massive; slightly hard, firm, nonsticky and slightly plastic; few very fine, fine, and medium roots; common very fine and fine tubular pores; continuous thin clay films lining pores and bridging mineral grains; medium acid; gradual wavy boundary.

Bt1–36 to 46 inches; yellowish red (5YR 5/6) clay, dark red (2.5YR 3/6) moist; massive; hard, firm, slightly sticky and plastic; few very fine, fine, and medium roots; common very fine tubular pores; continuous moderately thick clay films lining pores and bridging mineral grains; medium acid; gradual smooth boundary.

Bt2–46 to 65 inches; yellowish red (5YR 5/6) clay, red (2.5YR 4/6) moist; massive; hard, firm, slightly sticky and plastic; few very fine roots; common very fine and fine tubular pores; continuous moderately thick clay films lining pores and bridging mineral grains; strongly acid; gradual smooth boundary.

BCt–65 to 80 inches; strong brown (7.5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; massive; hard, firm, slightly sticky and plastic; few fine roots; common very fine and fine pores; few thin clay films lining pores; very strongly acid.

Range in characteristics: The soil is 65 to 120 inches deep. Reaction is slightly acid or medium acid in the surface and medium acid to very strongly acid in the subsoil. The iron oxide plus gibbsite to clay ratio is assumed to be greater than 0.2.

The A horizon has dry colors of 5YR 5/4; 7.5YR 3/4 or 4/4. Moist colors are 5YR 3/2, 3/3, 3/4; 7.5YR 3/2 or 3/4. Organic matter of the upper 10 inches is assumed to averages 4 to 6 percent and remains above 3 percent throughout the upper 20 inches.

The Bt horizon has dry colors of 5YR 4/6, 5/6; 7.5 YR 4/6 or 5/6. Moist colors are 2.5YR 3/6, 4/6, 5/6; 5YR 4/6 or 5/6. It is clay loam or clay with 35 to 50 percent clay. Base saturation (sum of cations) is 20 to 30 percent.

ANDIC CRYUMBREPTS

Andic Cryumbrepts are moderately deep or deep, well drained soils formed from material weathered from andesitic lahar. These soils are on mountainsides. Slope ranges from 15 to 50 percent. Vegetation is the Mule Ears series. Elevation ranges from 7,000 to 10,000 feet. The mean annual precipitation is 55 to 65 inches, most of which falls as snow.

Reference pedon for Andic Cryumbrepts is from a unit of Andic Cryumbrepts-Lithic Cryumbrepts association, 15 to 50 percent slopes; located at Hay Flat, Placerville R.D., in the SE1/4SW1/4 of section 7, T. 10 N., R. 17 E., Tragedy Springs quadrangle.

0–2 to 0 inches; fresh and decomposed litter.

A1-0 to 3 inches; dark brown (10YR 3/3) cobbly sandy loam, very dark brown (10YR 2/2) moist; soft, friable; 15 percent cobbles; slightly acid.

A2–3 to 11 inches; brown (10YR 4/3) cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; soft, friable; 20 percent cobbles; medium acid.

Bw–11 to 24 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; soft, friable; 25 percent cobbles; medium acid.

C–24 to 30 inches; pale brown (10YR 6/3) cobbly sandy loam; brown (10YR 4/3) moist; massive; 30 percent cobbles; strongly acid.

Cr–30 inches; slightly weathered andesitic lahar.

Range in characteristics: These soils are 20 to 60 inches deep. They are sandy loam, coarse sandy loam, or loam throughout the profile, with rock fragment content ranging from 15 to 85 percent. The surface horizon has dry values of 5 or less and moist values and chromas of 3 or less. It has a low bulk density and contains some amorphous clay. The mean annual soil temperature is 32° to 47° F.,and summer soil temperature at a depth of 20 inches does not vary more than 9° F. from winter soil temperature.

AQUEPTS

Aquepts are poorly drained or very poorly drained soils that are formed in alluvial material on broad valley flats and along drainages. Slope ranges from 0 to 15 percent. Vegetation is the Sedge-Rush series. The elevation is 4,000 to 8,500 feet. The mean annual precipitation is 50 to 70 inches, most of which falls as snow.

Reference pedon of Aquepts is from a unit of Aquepts and Umbrepts, 0 to 15 percent slopes; located in Leek Spring Valley in the NE 1/4 of the SW 1/4 of Section 18, T.9N., R.16E., Leek Spring Hill Quadrangle.

A1–0 to 18 inches; dark grayish brown (10YR 4/2) silt loam, black (10YR 2/1) moist; moderate fine and medium granular structure; many very fine roots; 5 percent pebbles; slightly acid; clear smooth boundary.

A2–18 to 28 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; common, fine, distinct, dark yellowish brown (10YR 4/6) mottles; moderate fine and medium granular structure; common fine roots; 5 percent pebbles; slightly acid; clear smooth boundary.

C1–28 to 36 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; common, distinct, dark yellowish brown (10YR 3/6) mottles; massive; few very fine roots; 8 percent pebbles; slightly acid; clear smooth boundary.

C2–36 to 60 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, very dark grayish brown (2.5Y 3/2) moist; massive; 30 percent pebbles; slightly acid.

Range in characteristics: Aquepts have dry values of 5 or less and moist values and chromas of 3 or less in the surface horizon. Colors of low chromas and high contrast mottles are found below the surface horizon. A reducing environment exists in these soils with the ground water table fluctuating to near the surface during periods of high runoff. Textures are stratified into layers that range from sand to clay. Rock fragments both gravel and cobble size are highly variable throughout with some profiles having more than 35 percent by volume.

BIGHILL SERIES

The Bighill series consists of moderately deep, well drained soils formed in material weathered from granitic rock. These soils are on mountainsides. Slopes range from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. The elevation is 3,100 to 5,600 feet. The mean annual precipitation is 50 to 65 inches, some of which falls as snow.

These soils are coarse-loamy, mixed, mesic Typic Xerumbrepts.

Typical pedon of Bighill coarse sandy loam is from a unit of Holland-Bighill complex, 5 to 30 percent slopes, located 1.3 miles south southeast of Quintette in the NE1/4NW1/4 of section 18, T. 12 N., R. 12 E., Tunnel Hill quadrangle.

0 – 1 to 0 inches; decomposing conifer needles and hardwood leaves.

A1 – 0 to 5 inches; dark grayish brown (10YR 4/2) coarse sandy loam, dark brown (10YR 3/3) moist; weak very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; common very fine interstitial pores and few fine tubular pores; slightly acid; clear smooth boundary.

A2 – 5 to 17 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots, few fine and medium roots; common very fine interstitial and tubular pores; 15 percent pebbles; medium acid; clear irregular boundary.

Bw – 17 to 32 inches; brown (7.5YR 5/4) cobbly sandy loam, dark brown (7.5YR 4/4) moist; weak very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, medium and coarse roots; common very fine interstitial pores, few very fine and fine tubular pores; 15 percent pebbles, 15 percent cobbles; strongly acid; abrupt irregular boundary.

Cr – 32 inches; brownish yellow highly weathered granite.

Range in characteristics: The soil is 20 to 40 inches deep. Base saturation (ammonium acetate) is 15 to 50 percent throughout. Rock fragment content is 0 to 35 percent, usually increasing with depth.

The A horizon has dry colors of 10YR 4/2, 4/3, 5/2 or 5/3. Moist colors are 10YR 2/2, 2/3, 3/2, or 3/3. Reaction is slightly acid or medium acid.

The Bw horizon has dry colors of 5YR 5/4; 7.5YR 5/4, 5/6, 5/8; 10YR 5/4 or 5/6. Moist colors are 5YR 3/4; 7.5YR 3/4, 4/4; 10YR 3/4, 4/3, or 4/4. It is a sandy loam or coarse sandy loam or their gravelly or cobbly equivalents. Reaction is medium acid or strongly acid.

CHAIX SERIES

The Chaix series consists of moderately deep, somewhat excessively drained soils formed in material weathered from granitic rock. These soils are on mountainsides. Slopes range from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 3,000 to 6,000 feet. The mean annual precipitation is 45 to 55 inches, some of which falls as snow.

These soils are coarse-loamy, mixed, mesic Dystric Xerochrepts.

Typical pedon of Chaix coarse sandy loamy is from a unit of Chaix-Pilliken coarse sandy loams, 5 to 30 percent slopes, located 2 miles west of Kyburz; 100 feet north from Weber Mill Road, about .75 miles west of intersection with U.S. Hwy. 50; 0.3 miles northeast of SW corner of section 29, T. 11 N., R. 15 E., Kyburz quadrangle.

0–1 1/2 to -0 inches; leaf litter.

A1–0 to 3 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine interstitial pores, few very fine tubular pores; medium acid; abrupt smooth boundary.

A2–3 to 5 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, nonsticky and nonplastic; common fine and few medium roots; many very fine interstitial pores, few very fine and fine tubular pores; medium acid; clear smooth boundary.

Bw–5 to 13 inches; light yellowish brown (10YR 6/4) coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots, common fine roots, and many medium and coarse roots; many very fine interstitial and few very fine tubular pores; strongly acid; gradual smooth boundary.

BC–13 to 30 inches; very pale brown (10YR 7/3) coarse sandy loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots, common medium and coarse roots; many very fine interstitial pores; strongly acid; clear wavy boundary.

Cr–30 inches; brownish and whitish weathered granitic rock; mineral grains retaining original rock structure.

Range in characteristics: The soil is 20 to 40 inches deep. The soil is slightly acid or medium acid in the surface and slightly acid to strongly acid in the subsoil. Textures are coarse sandy loam and sandy loam throughout the profile. Chromas are either greater than 3 or values are greater than 5 below the upper 7 inches. Base saturation (ammonium acetate) is 15 to 40 percent in all parts between 10 and 30 inches. Rock fragments in gravel and cobble size range from 1 to 25 percent throughout the profile.

The A horizon has dry colors of 10YR 4/2, 4/3, 5/2, 5/3, 6/2, 6/3, or 6/4. Moist colors are 10YR 3/1, 3/2, 3/3, 4/2, or 4/3.

The Bw horizon has dry colors of 10YR 6/4, 6/3, 5/4, or 5/6. Moist colors are 10YR 4/2, 4/3, 4/4, or 5/4.

COHASSET SERIES

The Cohasset series consists of deep and very deep, well drained soils that formed in material weathered from andesitic lahar. These soils are on mountainsides and on the tops and sides of volcanic tabular ridges. Slope ranges from 2 to 75 percent. Vegetation is the Mixed Conifer-Pine and Mixed Conifer-Fir series. Elevation is 2,000 to 6,000 feet. The mean annual precipitation is 40 to 60 inches, some of which falls as snow.

These soils are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Cohasset loam is from a unit of Cohasset-McCarthy association, 30 to 50 percent slopes, located 1/4 mile south of Telephone Ridge, in the SW1/4SW1/4 of section 15, T. 11 N., R. 13 E., Pollock Pines quadrangle.

01–1 to 1/2 inches; leaf litter

02–1/2 to 0 inches; decomposed leaf litter

A–0 to 4 inches; brown or dark brown (7.5YR 4/4) loam, dark reddish brown (5YR 3/3) moist; strong fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; common fine interstitial pores; 8 percent pebbles; slightly acid; clear wavy boundary.

AB–4 to 19 inches; brown or dark brown (7.5YR 4/4) loam, dark reddish brown (5YR 3/4) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; common fine interstitial pores; 8 percent pebbles; medium acid; clear wavy boundary.

Bt–19 to 28 inches; strong brown (7.5YR 4/6) gravelly clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few thin clay films lining pores and on faces of peds; common fine, medium, and coarse roots; common fine interstitial and tubular pores; 20 percent pebbles; medium acid; gradual wavy boundary.

BCt–28 to 44 inches; yellowish red (5YR 5/6) gravelly clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few thin clay films lining pores and on faces of peds; common medium and coarse roots; common fine interstitial and tubular pores; 20 percent pebbles; medium acid, clear wavy boundary.

Cr–44 inches; fractured, slightly weathered andesite lahar grading to hard rock at undetermined depth.

Range in characteristics: The soil is 40 to 80 inches deep. Rock fragment content ranges from 0 to 35 percent throughout, and consists of mainly gravel. Reaction is slightly acid or medium acid throughout. Base saturation (by sum of cations) is 35 to 50 percent throughout the upper 30 inches of the Bt horizon.

The A horizon has dry colors of 5YR 5/4; 7.5YR 4/4, 4/6, 5/4, 5/6; 10YR 3/3, 3/4, 4/4, or 5/4. Moist colors are 5YR 3/3, 3/4; 7.5YR 3/2, 3/3, 3/4, 4/2, or 10YR 3/3.

The Bt horizon has dry colors of 2.5YR 5/4; 5YR 4/4, 4/6, 5/6; 7.5YR 4/6, 5/4, 5/6, or 5/8. Moist colors are 2.5YR 3/6, 4/4; 5YR 3/4, 4/4; 7.5YR 3/4 or 4/4. It is loam or clay loam.

In map units 114 and 115 the Bt horizon is sandy clay loam which is outside the range defined for the series and the Cohasset soil is formed in material weathered from rhyolitic tuff. In map unit 115 slopes are greater than 50 percent which is outside the defined range of the series. These differences do not significantly affect the use or behavior of the soils.

CROZIER SERIES

The Crozier series consists of moderately deep, well drained soils that formed in material weathered from andesitic lahar. These soils are on mountainsides. Slope ranges from 5 to 50 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 2,000 to 6,000 feet. The mean annual precipitation is 45 to 60 inches, some of which falls as snow.

These soils are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Crozier loam is from a unit of Crozier-Cohasset loams, 5 to 30 percent slopes, located near Soldier Creek and McManus Ranch, in the NE1/4 of section 16, T. 11 N., R. 13 E., Pollock Pines quadrangle.

0–1 1/2 to 0 inches; leaf litter.

A–0 to 6 inches; dark brown (7.5YR 3/4) loam, dark reddish brown (5YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; common fine interstitial pores; 10 percent pebbles; slightly acid; clear wavy boundary.

BA–6 to 16 inches; strong brown (7.5YR 5/6) loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; common fine interstitial pores; 10 percent pebbles; slightly acid, gradual wavy boundary.

Bt–16 to 34 inches; yellowish red (5YR 5/6) cobbly loam, dark reddish brown (5YR 3/4) moist, few large distinct dark red (2.5YR 3/6) mottles; weak fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few thin clay films bridging mineral grains; common fine, medium, and coarse roots; common fine interstitial pores; 12 percent pebbles and 15 percent cobbles; slightly acid; gradual wavy boundary.

Cr–34 inches; fractured and weathered andesitic lahar, grading to hard rock at an undetermined depth.

Range in characteristics: The soil is 20 to 40 inches deep. The soil is slightly acid in the surface and slightly acid or medium acid in the subsoil. Base saturation (by sum of cations) is 35 to 50 percent throughout the upper 30 inches of the Bt horizon.

The A horizon has dry colors of 7.5YR 3/4; 10YR 4/2, 4/3, or 4/4. Moist colors are 5YR 3/3; 10YR 3/2, or 3/3.

The Bt horizon has dry colors of 5YR 5/6; 7.5YR 5/6, or 6/6. Moist colors are 5YR 3/3, 3/4, 4/4, or 7.5YR 4/4. It is loam or clay loam, or their gravelly or cobbly equivalents.

CRYUMBREPTS

Cryumbrepts consists of moderately deep to very deep, well drained to poorly drained soils formed in glacial outwash or alluvium. These soils are on glacial moraines, outwash terraces, and alluvial fans. Slope ranges from 2 to 50 percent. Vegetation is the Red Fir series. The elevation is 6,000 to 9,500 feet. The mean annual precipitation is 45 to 70 inches, most of which falls as snow.

Reference pedon of Cryumbrepts is from a unit of Cryumbrepts association, 5 to 50 percent slopes; located south of Cole Creek Lake, Mokelumne Wilderness, in the NE1/2 of section 3, T. 8 N., R. 17 E., Mokelumne Peak quadrangle.

0–2 to 0 inches; fresh and decomposed litter.

A1–0 to 3 inches; very dark grayish brown (10YR 3/2) sandy loam, black (10YR 2/1) moist; soft, very friable; slightly acid .

A2–3 to 17 inches; dark brown (10YR 3/3) cobbly sandy loam; very dark brown (10YR 2/2) moist; soft, very friable; medium acid.

Bw–17 to 25 inches; dark yellowish brown (10YR 4/4) cobbly sandy loam; very dark brown (10YR 2/2) moist; soft, very friable; medium acid.

C–25 to 61 inches; yellowish brown (10YR 5/4) cobbly sandy loam, dark brown (7.5YR 3/2) moist; soft, very friable; medium acid.

Range in characteristics: Cryumbrepts are 20 to 60 inches deep or more. Textures and rock fragment content are highly variable and may be stratified within some profiles. Textures are loam, silt loam, sandy loam, coarse sandy loam, or loamy sand. Rock fragments content is 5 to 60 percent. The surface horizons are both dark and thick and base saturation is assumed to be less than 40 percent. Areas of this soil (mapped as Cyrumbrepts,wet) are somewhat poorly drained or poorly drained. The Cyrumbrepts, wet occurs along drainages and in basins and has a water table within the upper 30 inches of the profile most of the year. Vegetation is the Sedge-Rush, Willow, Alder, or Lodgepole Pine CALVEG series. The mean annual soil temperature is 32° to 47° F. and summer soil temperature at a depth of 20 inches does not vary more than 9° F. from winter soil temperatures.

DOME SERIES

The Dome series consists of very deep, well drained soils formed in glacial outwash composed primarily of granitic rock. These soils are on mountainsides, ridges, and outwash plains. Slopes range from 2 to 50 percent. Vegetation is the Mixed Conifer-Fir and Mixed Conifer-Pine series. The elevation is 4,800 to 5,600 feet. The mean annual precipitation is 55 to 65 inches, some of which falls as snow.

These soils are coarse-loamy, mixed, mesic Dystric Xerochrepts.

Typical pedon of Dome coarse sandy loam is from a unit of Dome-Zeibright complex, 2 to 30 percent slopes, located 1/4 mile south of Forest Service road 12N68 and 1/2 mile east of Forest Service road 17N12 (Icehouse Road), in the NW1/4SW1/4 of section 24, T. 12 N., R. 14 E., Kyburz quadrangle.

0–1/2 to 0 inches; decomposed fir needles.

A–0 to 7 inches; brown (10YR 4/3) coarse sandy loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; few very fine interstitial pores; 12 percent pebbles; medium acid; clear irregular boundary.

Bw1–7 to 16 inches; strong brown (7.5YR 5/6) coarse sandy loam, reddish brown (5YR 4/4) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and coarse roots; few very fine interstitial pores; 13 percent pebbles; strongly acid; gradual smooth boundary.

Bw2–16 to 31 inches; strong brown (7.5YR 5/6) coarse sandy loam, reddish brown (5YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots, common medium and coarse roots; few very fine interstitial pores; 13 percent pebbles; strongly acid; gradual smooth boundary.

C–31 to 60 inches; yellowish brown (10YR 5/6) cobbly coarse sandy loam, strong brown (7.5YR 5/8) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; few very fine interstitial and tubular pores; 15 percent pebbles , 5 percent cobbles, 5 percent stones; very strongly acid; 10 percent of this horizon is a weak red (2.5YR 5/2) sandy loam, weakly cemented.

Range in characteristics: The soil is 60 inches deep or more. Rock fragment content is 5 to 30 percent throughout. Chromas are either greater than 3 or values are greater than 5 below the upper 7 inches. Base saturation (ammonium acetate) is 10 to 25 percent in all parts between 10 and 30 inches. Reaction is medium acid through very strongly acid and usually becomes more acid with depth.

The A horizon has dry colors of 7.5YR 4/2, 4/4, 5/2, 5/3, 6/2, 6/4; 10YR 4/2, 4/3, 5/2, 5/3, 6/2, or 6/3. Moist colors are 7.5YR 3/2, 3/4, 4/2; 10YR 3/2, 3/3, 3/4, or 4/2.

The Bw horizon has dry colors of 7.5YR or 10YR 5/4, 5/6, 5/8, 6/6, 6/8, or 7/3. Moist colors are 5YR, 7.5YR, or 10YR 4/4, 4/6, 5/4, 5/6, 5/8, 6/4, 6/6, or 6/8. It is sandy loam, coarse sandy loam, or their gravelly equivalents.

The C horizon is similar in color to the Bw horizon but with generally lower chroma. It is sandy loam, coarse sandy loam, loamy coarse sand, or their gravelly or cobbly equivalents. It may contain up to 50 percent discontinuous weak cementation.

The Dome Variant consists of very deep, somewhat poorly drained soils formed in glacial outwash composed primarily of granitic rock. These soils formed on outwash plains in small basins and now boarder wet meadows. Slope ranges from 0 to 10 percent. Vegetation is the Lodgepole Pine series. Elevation is 5,000 to 5,400 feet. The mean annual precipitation is 55 to 60 inches, some which falls as snow.

These soils are coarse-loamy, mixed, mesic Dystric Xerochrepts.

Typical pedon of Dome Variant is from a unit of Dome Variant coarse sandy loam, 2 to 10 percent slopes, located 2.5 miles north northeast of Icehouse Resort and 0.6 miles east of Jones Place in the NW1/4NE1/4 of section 36, T. 12 N., R. 14 E., Kyburz quadrangle.

0–3 to 0 inches; lodgepole pine and white fir needles and twigs.

A1–0 to 7 inches; varigated brown and grayish brown (10YR 5/3, 5/2) coarse sandy loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots and few coarse roots; common very fine and fine tubular pores; 3 percent rounded pebbles (2 to 50 mm); medium acid; gradual wavy boundary.

A2–7 to 14 inches; pale brown (10YR 6/3) coarse sandy loam, dark brown (7.5YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and coarse roots, common fine and medium roots; common very fine and fine tubular pores; 3 percent rounded pebbles (2 to 50 mm); medium acid; clear irregular boundary.

AB–14 to 22 inches; variegated light yellowish brown, brownish yellow, and yellowish brown (10YR 6/4, 6/6, and 5/8) coarse sandy loam, dark brown (7.5YR 4/4 and 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, and coarse roots, common medium roots; common very fine and fine interstitial pores, few very fine and fine tubular pores; 3 percent rounded pebbles (2 to 50 mm); medium acid; gradual wavy boundary.

Bw–22 to 33 inches; variegated very pale brown and brownish yellow (10YR 7/3, 6/6, and 6/8) coarse sandy loam, strong brown and reddish yellow (7.5YR 5/6, 5/8 and 6/8) moist; weak fine and medium subangular blocky structure; hard, friable, nonsticky and nonplastic; few very fine and medium roots; common very fine and fine interstitial pores, few very fine and fine tubular pores; few thin clay films bridging sand grains and lining pores; 5 percent rounded pebbles (2 to 50 mm); medium acid; gradual wavy boundary.

BC–33 to 55 inches; variegated very pale brown and brownish yellow (10YR 7/3, 6/6, and 6/8) coarse sandy loam, strong brown, reddish yellow and light brownish gray (7.5YR 5/6, 5/8, 6/8, and 10YR 6/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine and medium roots; many very fine and fine interstitial pores, few very fine and fine tubular pores; few thin clay films bridging mineral grains; 5 percent rounded pebbles (2 to 50 mm); medium acid; gradual wavy boundary.

Cg–55 to 60 inches; variegated very pale brown, brownish yellow and pinkish white (10YR 7/3, 6/6, 6/8, and 5YR 8/2) coarse loamy sand, yellowish brown, light brownish gray, and gray (10YR 5/6, 5/8, 6/2, and 5YR 5/1) moist; single grained; loose; few very fine and medium roots; many very fine and fine interstitial pores; 5 percent rounded pebbles (2 to 50 mm); medium acid; free water present when described in August 1984.

Range in characteristics: The soil is 60 inches deep or more. A water table fluctuates between the depths of 40 and 80 inches or more during summer and 20 and 60 inches during winter. Reaction is medium acid or strongly acid throughout. Chromas are either greater than 3 or values are greater than 5 below the upper 7 inches. Base saturation (ammonium acetate) is 10 to 40 percent in all parts between 10 and 30 inches. The particle size control section averages 8 to 18 percent clay and 0 to 25 percent gravel.

The A horizon has dry colors of 10YR 5/2, 5/3, 6/3, or 6/4. Moist colors are 10YR 3/2, 3/3, 3/4, 4/4; 7.5YR 3/2 or 3/4.

The B horizon has dry colors of 10YR 6/6, 6/8, or 7/3. Moist colors are 10YR or 7.5YR 5/6, 5/8, 6/2, or 6/8. Texture is coarse sandy loam, sandy loam, or their gravelly equivalents.

The C horizon has dry colors of 10YR or 7.5YR 6/2, 6/4, 6/6, or 6/8. Moist colors are 10YR or 7.5YR 5/4, 5/6, 5/8, or 6/2. Low chroma mottles in hues of 10YR, 2.5Y, or 5Y are common. Texture is coarse sandy loam or loamy coarse sand, or their gravelly equivalents.

Fluvents are very deep, moderately well drained or somewhat poorly drained soils formed in mixed alluvium on narrow flood plains. Slopes range from 0 to 10 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 4,000 to 4,800 feet. The mean annual precipitation is 50 to 60 inches, some of which falls as snow.

Reference pedon for Fluvents is from a unit of Fluvents, 0 to 10 percent slopes, located along Pilot Creek in the NW1/4SE1/4 of section 9, T. 12 N., R. 13 E., Devil Peak quadrangle.

A–0 to 5 inches; light brownish gray (10YR 6/2) sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; common very fine and coarse roots, many fine and medium roots; few fine tubular pores, common very fine interstitial pores; medium acid; abrupt wavy boundary.

C1–5 to 9 inches; light yellowish brown (10YR 6/4) coarse sand, dark yellowish brown (10YR 3/4) moist; single grain; loose; common coarse roots, many fine and medium roots; many fine interestitial pores; medium acid; abrupt wavy boundary.

C2–9 to 13 inches; pale brown (10YR 6/3) loamy sand, dark yellowish brown (10YR 4/4) moist; single grain; loose; few coarse roots, many fine and medium roots; common very fine interstitial pores; medium acid; clear wavy boundary.

Ab–13 to 23 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few coarse roots, common fine and medium roots; common fine tubular and interstitial pores; strongly acid; abrupt wavy boundary.

C3–23 to 37 inches; light gray (10YR 6/1) straitified loamy sand and coarse sandy loam, dark brown (10YR 3/3) moist; common dark yellowish brown (10YR 4/6) mottles; single grain; loose; few coarse roots, common fine and medium roots; common very fine and fine interstitial pores; medium acid; clear wavy boundary.

Cg–37 to 60 inches; gray (N 6/0) loamy fine sand, very dark grayish brown (2.5Y 3/2) moist; many black (5Y 2.5/2) mottles; massive; soft, very friable, nonsticky and nonplastic; few fine, medium and coarse roots; few very fine interstitial pores; medium acid.

Range in characteristics: Fluvents are straitified sandy loams to sands. Gravel and cobble content ranges from 0 to 55 percent throughout. A water table fluctuates between the depths of 10 and 50 inches in winter and 40 and 100 inches in summer.

The A horizon has hues of 7.5YR, 10YR, or 2.5Y. Value and chroma commonly are too high and bright for an umbric epipedon, but thin dark strata are sometimes present.

The C horizon has hues of 10YR, 2.5Y or 5Y. Mottles are common to many in the lower part.

GERLE SERIES

The Gerle Series consists of very deep, well drained soils that formed in material weathered from glacial till, glacial outwash, and alluvium composed primarily of granitic rock. These soils are on lateral and terminal moraines and glacial outwash. Slope ranges from 2 to 50 percent. Vegetation is the Mixed Conifer-Fir series. Elevation is 5,600 to 7,500 feet. The mean annual precipitation is 50 to 70 inches, most of which falls as snow.

These soils are coarse-loamy, mixed, frigid Typic Xerumbrepts.

Typical pedon of Gerle sandy loam is from a unit of Gerle-Tallac Complex, 5 to 30 percent slopes, located 20 feet east of road along Gerle Creek, in the NW1/4SW1/4 of section 2, T. 13 N., R. 14 E., Robbs Peak quadrangle.

0–2 to 0 inches; pine and fir needle litter.

A1–0 to 3 inches; dark brown (10YR 4/3) sandy loam, black (10YR 2/1) moist; moderate medium and coarse granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few very fine interstitial pores; 2 percent pebbles; medium acid; clear smooth boundary.

A2–3 to 12 inches; dark yellowish brown (10YR 4/4) sandy loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, few coarse roots; few very fine interstitial pores; 2 percent pebbles; medium acid; clear smooth boundary.

Bw1–12 to 18 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; strong medium and coarse granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots, few medium roots; few very fine interstitial pores; 2 percent pebbles; slightly acid; gradual smooth boundary.

Bw2–18 to 30 inches; light yellowish brown (10YR 6/4) sandy loam, dark brown (7.5YR 3/4) moist; strong coarse and very coarse granular and weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine roots, few very fine and medium roots; few very fine interstitial pores; 2 percent pebbles; slightly acid; gradual smooth boundary.

BC–30 to 41 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; few fine and medium roots; few very fine interstitial pores; 5 percent pebbles; neutral; gradual smooth boundary.

C–41 to 62 inches; yellowish brown (10YR 5/4) cobbly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, nonsticky and nonplastic; 5 percent pebbles and 25 percent cobbles; neutral.

Range in characteristics: The soil is 60 inches deep or more to a compacted horizon or cemented pan.

The A horizon has dry colors of 10YR 4/2, 4/3, 4/4, or 5/3. Moist colors are 7.5YR 3/2; 10YR 2/1, 2/2, 3/2, or 3/3 in the upper 7 to 15 inches. Base saturation (ammomium acetate) is 5 to 40 percent throughout. It is strongly acid to neutral.

The Bw horizon has dry colors of 7.5YR 5/4; 10YR 5/4, 5/6, 6/3, or 6/4. Moist colors are 7.5YR 3/4; 10YR 3/4, 4/2, or 4/3. Reaction is
medium acid or slightly acid. It is coarse sandy loam, sandy loam, or their gravelly or cobbly equivalents.

The C horizon has dry colors of 10YR 5/4, 5/6, 6/3, 6/4, 6/6, or 7/3. Moist colors are 7.5YR 4/6, 5/8; 10YR 3/4, 4/4, 5/3, or 5/4. It is cobbly or gravelly coarse sandy loam and less commonly sandy loam or gravelly loamy coarse sand. It has 5 to 25 percent gravel and 0 to 25 percent cobbles. Reaction is neutral to medium acid.

HANGTOWN SERIES

The Hangtown series consists of deep, well drained soils that formed in material weathered from metasedimentary rock. These soils are on mountainsides. Slope ranges from 5 to 50 percent. Vegetation is the Red Fir series. Elevation is 5,800 to 7,900 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are loamy-skeletal, mixed, frigid Dystric Xerochrepts.

Typical pedon of Hangtown gravelly sandy loam is from a unit of Hangtown-Lithic Xerumbrepts complex, 15 to 50 percent slopes, located 200 feet west of Joe's Spring in the NW1/4, SE1/4 of sec. 23, T. 14 N., R. 14 E., Wentworth Springs quadrangle.

O–1/2 to 0 inches; fir needle litter.

A–0 to 3 inches; dark brown (10YR 3/3) gravelly sandy loam, very dark brown (10YR 2/2), moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, few fine roots; 20 percent pebbles, 5 percent cobbles; strongly acid; abrupt smooth boundary.

Bw1–3 to 10 inches; dark brown (7.5YR 3/4) very gravelly sandy loam, dark brown (7.5YR 3/4) moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; few very fine discontinuous random irregular pores; 25 percent pebbles, 10 percent cobbles, and 10 percent stones; strongly acid; gradual smooth boundary.

Bw2–10 to 24 inches; brown (7.5YR 4/4) very gravelly sandy loam, dark brown (7.5YR 3/4) moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, medium, and coarse roots; 25 percent pebbles, 10 percent cobbles, and 10 percent stones; strongly acid; gradual smooth boundary.

C1–24 to 35 inches; brown (10YR 5/3) very cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse granular structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, and coarse roots; 30 percent pebbles, 20 percent cobbles, and 5 percent stones; strongly acid; gradual smooth boundary.

C2–35 to 46 inches; pale brown (10YR 6/3) very stony sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent pebbles, 10 percent cobbles, 20 percent stones; strongly acid.

Cr–46 inches; highly fractured metasedimentary rock.

Range in characteristics: The soil is 40 to 60 inches deep. Rock fragment content ranges from 35 to 60 percent in the particle-size control section. Chromas are either greater than 3 or values are greater than 5 below the upper 7 inches. Base saturation (ammonium acetate) is 10 to 50 percent throughout. Reaction is medium acid or strongly acid throughout.

The A horizon has dry colors of 7.5YR 4/4; 10YR 3/3, 3/4, or 4/4. Moist colors are 7.5YR 3/2 or 10YR 2/2. Gravel content ranges from 10 to 20 percent and cobbles range from 0 to 5 percent.

The Bw horizon has dry colors of 7.5YR 4/4, 4/6, 5/4; 10YR 4/4, or 5/4. Moist colors are 7.5YR or 10YR 3/4. It is sandy loam or fine sandy loam with 10 to 45 percent gravel, 5 to 25 percent cobbles, and 5 to 25 percent stones.

The C horizon has dry colors of 10YR 5/3, 5/4, 5/6, 6/3, 6/4, or 6/6. Moist colors are 10YR 3/3, 3/4, 4/3, or 4/4. This horizon is sandy loam or fine sandy loam with 15 to 35 percent gravel, 10 to 30 percent cobbles, and 0 to 30 percent stones.

HARTLESS SERIES

The Hartless series consists of deep and very deep, well drained soils formed in material weathered from metasedimentary rock. These soils are on mountainsides and ridgetops. Slopes range from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 4,400 to 6,000 feet. The mean annual precipitation is 50 to 65 inches, some of which falls as snow.

These soils are loamy-skeletal, mixed, mesic Dystric Xerochrepts.

Typical pedon of Hartless very gravelly loam is from a unit of Hartless-Mieruf very gravelly loams, 30 to 50 percent slopes, located about 1.25 miles north of Union Valley Dam on the west fork of Forest Service road 12N30.2, about 1,200 feet north of it's intersection with Forest Service road 12N52.1, in the center of the SE1/4SW1/4 of section 18, T. 12 N., R. 14 E., Robbs Peak quadrangle.

0 – 1 to 0 inches; leaves, needles and twigs in various stages of decomposition mixed with gravel.

A – 0 to 7 inches; very dark grayish brown (10YR 3/2) very gravelly loam, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, common fine roots; common very fine, fine, medium and coarse interstitial pores; 55 percent pebbles; medium acid; clear smooth boundary.

BA – 7 to 21 inches; brown (7.5YR 5/4) very gravelly fine sandy loam, dark brown (7.5YR 3/4) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine and fine tubular and interstitial pores; 35 percent pebbles and 5 percent cobbles; very strongly acid; clear smooth boundary.

Bw1 – 21 to 36 inches; strong brown (7.5YR 5/6) very gravelly fine sandy loam, strong brown (7.5YR 4/6) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine and fine, and few medium tubular and interstitial pores; 40 percent pebbles and 10 percent cobbles; very strongly acid; gradual wavy boundary.

Bw2 – 36 to 58 inches; reddish yellow (7.5YR 6/6) very gravelly fine sandy loam, strong brown (7.5YR 4/6) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine and fine, and few medium tubular and interstitial pores; 40 percent pebbles and 10 percent cobbles; very strongly acid; gradual wavy boundary.

BC – 58 to 64 inches; reddish yellow (7.5YR 6/6) very gravelly fine sandy loam, strong brown (7.5YR 4/6) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine, medium, and coarse roots; few very fine and fine tubular pores; 30 percent pebbles and 15 percent cobbles; strongly acid.

Range in characteristics: The soil is 40 to 60 inches deep or more. The particle-size control section averages from 10 to 18 percent clay and 40 to 60 percent rock fragments. Chromas are either greater than 3 or values are greater than 5 below the upper 7 inches. Base saturation (ammonium acetate) is 5 to 35 percent throughout.

The A horizon has dry colors of 10YR 3/2, 3/3, 3/4, 4/4; 7.5YR 3/4 or 4/4. Moist colors are is 10YR 2/1, 2/2, 3/2, 3/3; 7.5YR 2/2 or 3/2. It is 3 to 7 inches thick. Clay content ranges from 12 to 22 percent. Gravel content ranges from 20 to 60 percent. Cobble content ranges from 0 to 10 percent. Reaction is medium acid or strongly acid.

The Bw horizon has dry colors of 7.5YR 5/4, 5/6 or 6/6. Moist colors are 7.5YR 3/4, 4/4, 4/6, 5/6; 5YR 4/6 or 5/6. It is very gravelly or very cobbly loam or sandy loam. Clay content ranges from 10 to 20 percent. Gravel content ranges from 30 to 55 percent. Cobble content ranges from 5 to 20 percent. Stone content ranges from 0 to 5 percent. Reaction is strongly acid or very strongly acid. Some pedons have a C horizon.

In map units 152 and 153 there is an increase in clay content in the subsoil which qualifies as a weak argillic horizon. This is outside the range for the series. This difference does not significantly affect the use or behavior of the soils.

HARTLESS VARIANT

The Hartless Variant consists of deep and very deep, well drained soils formed in material weathered from basaltic lahar. These soils are on the tops and sides of volcanic tabular ridges. Slopes range from 2 to 50 percent. The vegetation is the Mixed Conifer-Pine and Mixed Conifer-Fir series. Elevation is 5,100 to 5,500 feet. The mean annual precipitation is 55 to 60 inches, some of which falls as snow.

These soils are loamy-skeletal, mixed, mesic Dystric Xerochrepts.

Typical pedon of Hartless Variant very gravelly sandy loam is from a unit of Hartless Variant very gravelly sandy loam, 30 to 50 percent slopes, located 0.25 miles south of Forest Service road 12N68 and 2 miles east of Forest Service road 17N12 (Icehouse Road), in the NE1/4SW1/4 of section 19, T. 12 N., R. 15 E., Kyburz quadrangle.

0 – 1/4 to 0 inches; discontinuous litter.

A – 0 to 12 inches; brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine interstitial pores; 25 percent pebbles; 10 percent cobbles and 5 percent stones; neutral; clear smooth boundary.

Bw – 12 to 21 inches; light brown (7.5YR 6/4) gravelly sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few very fine interstitial pores; 15 percent pebbles, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

C1 – 21 to 41 inches; pale brown (10YR 6/3) very cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine interstitial pores; 15 percent pebbles, 20 percent cobbles, and 10 percent stones; neutral; abrupt smooth boundary.

2C2 – 41 to 60 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; massive; loose, nonsticky, nonplastic; few very fine and fine roots; few very fine interstitial pores; medium acid.

Range in characteristics: The soil is 40 to 60 inches deep or more. Pedons which formed in place are underlain by basaltic lahar material. Pedons which formed in colluvium of basaltic lahar may be underlain by granitic rock. Base saturation (ammonium acetate) is assumed to be 30 to 60 percent throughout. Rock fragment content ranges from 20 to 75 percent in the A and Bw horizons; it averages 35 to 60 percent in the particle size control section; it averages 0 to 10 percent below the lithologic discontinuity, when present.

The A horizon has dry colors of 7.5YR 5/4, 6/4; 10YR 5/4 or 6/4. Moist colors are 7.5YR 3/4, 4/4; 10YR 4/4 or 3/4. It is slightly acid or neutral.

The Bw horizon has dry colors of 7.5YR 6/4, 6/6 or 10YR 6/4. Moist colors are 7.5YR 4/4, 5/4 or 10YR 4/4. It is gravelly, cobbly, very gravelly, or very cobbly sandy loam. It is medium acid to neutral.

The C horizon has dry colors of 10YR 6/3 or 6/4. Moist colors are 10YR 4/3, 4/4 or 5/3. Some pedons lack a lithologic discontinuity to granitic rock.

HOLLAND SERIES

The Holland series consists of very deep, well drained soils that formed in material weathered from granitic rock. These soils are on mountainsides and ridges. Slope ranges from 5 to 50 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 2,500 to 6,000 feet. The mean annual precipitation is 40 to 65 inches, some of which falls as snow.

These soils are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Holland loam is from a unit of Holland-Pilliken association, 30 to 50 percent slopes, located 1/4 mile south of Ice House Road in the SE1/4NW1/4 of section 29, T. 11 N., R. 14 E., Riverton quadrangle.

0–2 to 0 inches; leaf litter.

A–0 to 8 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, friable, nonsticky and slightly plastic; many fine and medium roots; common very fine interstitial pores; slightly acid; clear smooth boundary.

BAt–8 to 17 inches; strong brown (7.5YR 5/6) sandy clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few thin clay films lining pores and on the faces of peds; many fine and medium roots, few coarse roots; many very fine interstitial and tubular pores; slightly acid; gradual wavy boundary.

Bt1–17 to 36 inches; reddish yellow (7.5YR 6/6) sandy clay loam, strong brown (7.5YR 4/6) moist; strong coarse subangular blocky structure; very hard, very firm, sticky and plastic; continuous moderately thick clay films lining pores and on faces of peds; common fine and medium roots, few coarse roots; many fine interstitial and tubular pores; medium acid; clear wavy boundary.

Bt2–36 to 56 inches; reddish yellow (7.5YR 6/6) sandy clay loam, strong brown (7.5YR 5/6) moist; strong coarse subangular blocky structure; hard, firm, sticky and plastic; many moderately thick clay films lining pores and on faces of peds; few fine, medium, and coarse roots; common medium interstitial pores, few tubular pores; medium acid; gradual wavy boundary.

C1–56 to 61 inches; yellowish brown (10YR 5/6) sandy loam, brown and dark brown (7.5YR 4/4) moist; massive; hard, firm, nonsticky and nonplastic; few moderately thick clay films lining pores and on the faces of peds; few fine and coarse roots; few fine interstitial pores; medium acid; gradual wavy boundary.

C2–61 to 64 inches; brownish yellow (10YR 6/6) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, nonsticky and nonplastic; few moderately thick clay films lining pores and on faces of peds; few fine and coarse roots; few fine interstitial pores; medium acid.

Range in characteristics: The soil is greater than 60 inches deep. Base saturation (by sum of cations) is 50 to 70 percent throughout the Bt horizon.

The A horizon has dry colors of 7.5YR 5/4; 10YR 4/2, 4/3, or 5/2. Moist colors are 7.5YR 3/4, 3/2; 10YR 3/3, 4/3, or 3/2. Reaction is slightly acid or medium acid.

The Bt horizon has dry colors of 7.5YR 5/4, 5/6, or 6/6. Moist colors are 5YR 4/4, 4/6, 5/4; 7.5YR 4/4, 4/6, or 5/6. It is sandy clay loam or clay loam. Reaction is medium acid or strongly acid.

The BCt or C, when present, has hues of 7.5YR or 10YR. Reaction is medium acid to very strongly acid.

JOCAL SERIES

The Jocal series consists of deep and very deep, well drained soils that formed in material weathered from metasedimentary rock. These soils are on mountainsides and ridgetops. Slope ranges from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 2,000 to 6,500 feet. The mean annual precipitation is 40 to 65 inches, some of which falls as snow.

These soils are fine-loamy, mixed, mesic Typic Haploxerults.

Typical pedon of Jocal loam is from a unit of Jocal loam, 30 to 50 percent slopes, located near Camp Seven in the SE1/4SW1/4, of section 31, T. 12 N., R. 13 E., Pollock Pines quadrangle.

0–2 to 0 inches; decomposing fir litter.

A–0 to 4 inches; brown (7.5YR 4/4) loam, dark brown (7.5YR 3/4) moist; moderate fine granular structure; slightly hard, firm, slightly sticky and slightly plastic; common fine roots; many very fine interstitial pores; 10 percent pebbles; medium acid; clear smooth boundary.

AB–4 to 15 inches; strong brown (7.5YR 5/6) silt loam, yellowish red (5YR 4/6) moist; strong fine granular structure; slightly hard, firm, slightly sticky and slightly plastic; common moderately thick clay films on ped faces and lining pores; common fine and medium roots; many very fine interstitial pores, common fine tubular pores; 5 percent pebbles; medium acid; gradual smooth boundary.

Bt1–15 to 22 inches; reddish yellow (7.5YR 6/6) silty clay loam, yellowish red (5YR 5/6) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; continuous thick clay films on ped faces and lining pores; few fine roots, common medium and coarse roots; common fine tubular pores; 5 percent pebbles; medium acid; clear smooth boundary.

Bt2–22 to 45 inches; reddish yellow (7.5YR 6/6) silty clay loam, yellowish red (5YR 5/6) moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky and plastic; continuous thick clay films lining pores and on ped faces; common medium and coarse roots; common very fine interstitial pores, common fine tubular pores; 5 percent pebbles; medium acid; clear smooth boundary.

C–45 to 61 inches; reddish yellow (5YR 7/6) sandy clay loam, yellowish red (5YR 5/6) moist; massive; hard, firm, sticky, plastic; few coarse roots; few very fine interstitial pores; 5 percent pebbles; medium acid.

Range in Characteristics: The soil is 40 to greater than 60 inches deep. Base saturation (by sum of cations) in the lower B and C horizons is 20 to 35 percent. Reaction is slightly acid in the surface to strongly acid in the subsoil.

The A horizon has dry colors of 5YR 5/3, 4/4, 5/4, 4/6, 5/6, 6/6; 7.5YR 4/4 or 5/4. Moist colors are 5YR 3/2, 3/3, 3/4, 4/4; 7.5YR 3/2, or 3/4. It is gravelly loam, loam, or silt loam.

The Bt horizon has dry colors of 2.5YR 5/6, 4/8, 5/8; 7.5YR 5/6, 6/6 or 5YR 4/6, 5/6. Moist colors are 2.5YR 4/4, 4/6, 4/8; 5YR 3/4, 4/4, 4/6, 5/6, 4/8 or 7.5YR 4/4, 5/6. It is sandy clay, silty clay loam, or clay loam.

The C horizon, when present, has dry colors of 5YR 4/8, 7/6, or 7.5YR 7/8. Moist colors are 2.5YR 4/6, 5YR 5/6, or 7.5YR 5/8. Textures are silty clay loam, clay loam, sandy clay loam, or silt loam.

LEDFORD SERIES

The Ledford consists of deep, somewhat excessively drained soils that formed in material weathered from granitic rock. These soils are on mountainsides. Slope ranges from 5 to 50 percent. Vegetation is the Red Fir series. Elevation is 5,600 to 8,500 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are coarse-loamy, mixed, frigid Entic Xerumbrepts.

Typical pedon of Ledford sandy loam is from a unit of Ledford-Notned complex, 5 to 30 percent slopes, located in a roadcut of spur road on the west of road to Dellar Meadow between Bunker Hill and McKinstry Peak in the NW1/4NE1/4 of section 23, T. 14 N., R. 14 E., Wentworth Springs quadrangle.

0–1 to 0 inches; fir needle duff.

A1–0 to 2 inches; dark brown (10YR 3/3) sandy loam, very dark brown (10YR 2/2) moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; 10 percent pebbles; slightly acid; clear smooth boundary.

A2–2 to 6 inches; dark brown (10YR 4/3) coarse sandy loam, dark brown (10YR 3/3) moist, moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, few medium and coarse roots; common very fine tubular pores; 10 percent pebbles; slightly acid; gradual smooth boundary.

A3–6 to 12 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots, few fine, medium, and coarse roots; common very fine tubular pores; 10 percent pebbles; slightly acid; gradual smooth boundary.

Bw–12 to 37 inches; yellowish brown (10YR 5/4) coarse sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium subangular blocky and strong fine granular structure; soft, very friable, nonsticky and nonplastic; few fine, medium, and coarse roots; 10 percent pebbles; slightly acid; gradual smooth boundary.

C–37 to 47 inches; light yellowish brown (10YR 6/4) coarse sandy loam, dark brown (10YR 4/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; 10 percent pebbles; slightly acid; gradual smooth boundary.

Cr–47 inches; highly weathered granitic rock.

Range in characteristics: The soil is 40 to 60 inches deep and is slightly acid in the surface to medium acid in the subsoil. Base saturation (ammonium acetate) is 20 to 45 percent in the A horizon.

The A horizon has dry colors of 10YR 3/3, 4/2, 4/3 or 5/3. Moist colors are 10YR 2/2, 3/1, 3/2, or 3/3. Textures are sandy loam or coarse sandy loam.

The Bw horizon has dry colors of 10YR 5/4 or 6/4. Moist colors are 7.5YR 3/4; 10YR 3/4, 4/3, or 4/4. It is sandy loam, coarse sandy loam, or gravelly sandy loam.

The C horizon has dry colors of 10YR 5/4, 5/6, 6/3, or 6/4. Moist colors are 7.5YR 4/6; 10YR 3/4, 4/3. It is sandy loam, coarse sandy loam, or their gravelly equivalents.

Ledford soils in this survey typically have a cambic horizon that is not defined in the range for the series. This difference, however does not significantly affect use and management.

LEDMOUNT SERIES

The Ledmount series consists of shallow, somewhat excessively drained soils that formed in material weathered from andesitic lahar. These soils formed on the tops and sides of volcanic tabular ridges. Slope ranges from 2 to 75 percent. Vegetation is the Greenleaf Manzanita series. Elevation is 2,000 to 6,000 feet. The mean annual precipitaton is 45 to 60 inches, some of which falls as snow.

These soils are medial, mesic, Lithic Xerumbrepts.

Typical pedon of Ledmount cobbly sandy loam is from a unit of Ledmount-Rock outcrop association, 30 to 75 percent slopes, located 500 feet south of junction of the Peavine Ridge Road and Union Valley Powerhouse Road in the SE1/4NE1/4 of section 18, T. 11 N., R. 14 E., Riverton quadrangle.

0–1/4 to 0 inches; leaf litter.

A1–0 to 6 inches; dark grayish brown (10YR 4/2) cobbly sandy loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 15 percent pebbles and 15 percent cobbles; medium acid; clear smooth boundary.

A2–6 to 15 inches; dark brown (10YR 3/3) cobbly sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; common fine and medium roots, few coarse roots; many very fine and fine interstitial pores; 15 percent pebbles and 12 percent cobbles; medium acid; abrupt smooth boundary.

R–15 inches; fractured andesitic lahar.

Range in characteristics: The soil is 10 to 20 inches deep. Base saturation (ammonium acetate) is 10 to 35 percent throughout the profile. Reaction is slightly acid or medium acid. Rock fragment content is 15 to 35 percent throughout.

The A horizon has dry colors of 10YR 3/2, 3/3, 4/2, 5/2, or 5/3. Moist colors are 10YR 2/1, 2/2, 3/2, or 3/3.

LITHIC CRYUMBREPTS

Lithic Cryumbrepts are shallow, excessively drained soils formed in material weathered from andesitic lahar. Lithic Cryumbrepts are on mountainsides and ridgetops. Slope ranges from 5 to 75 percent. Vegetation is the Mule Ears and Mountain Whitethorn series. Elevation is 6,000 to 10,000 feet. The mean annual precipitation is 45 to 80 inches, most of which falls as snow.

Reference pedon for Lithic Cryumbrepts is from a unit of Lithic Cryumbrepts-Waca association, 5 to 30 percent slopes, at Packsaddle Pass, Placerville Ranger District, in the SW1/4NW1/4 of section 2, T. 10 N., R. 16 E., Pryamid Peak quadrangle.

A1–0 to 3 inches; dark brown (10YR 4/3) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; many very fine interstitial pores; 25 percent pebbles and 4 percent cobbles; medium acid ; abrupt smooth boundary.

A2–3 to 12 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate medium granular structure; soft, very friable, nonsticky and slightly plastic; few fine roots, common medium and coarse roots; many very fine interstitial pores; 35 percent pebbles and 8 percent cobbles; medium acid; clear smooth boundary.

Bw–12 to 19 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; few fine roots, common medium roots, and many coarse roots; many very fine interstitial pores; 60 percent pebbles, 8 percent cobbles; medium acid; abrupt wavy boundary.

R–19 inches; slightly weathered and fractured andesitic lahar.

Range in Characteristics: These soils are 4 to 20 inches deep. Base saturation (ammonium acetate) is 5 to 20 percent throughout the profile. The profile is sandy loam, fine sandy loam, or loam with 20 to 80 percent rock fragments.

LITHIC XERUMBREPTS

Lithic Xerumbrepts are shallow, excessively drained soils that formed in material weathered from granitic and metamorphic rock. These soils are on mountainsides and canyonsides. Slopes range from 15 to 100 percent. Vegetation is the Mountain Whitethorn and Huckleberry Oak series. Elevation is 2,400 to 8,500 feet. The mean annual precipitation is 50 to 70 inches, some of which falls as snow.

Reference pedon of Lithic Xerumbrepts is from a unit of Lithic Xerumbrepts-Rock outcrop complex, 15 to 75 percent slopes, near 42 Mile Campground, Placerville Ranger District, in the SW1/4W1/4 of section 19, T. 11 N., R. 17 E., Pyramid Peak quadrangle.

0–1/4 inch of partially decomposed leaves.

A1–0 to 3 inches; dark grayish brown (10YR 4/2) gravelly loamy sand, black (10YR 2/1) moist; single grained; loose, nonsticky and nonplastic; no roots; few medium interstitial pores; 20 percent pebbles, 5 percent cobbles; medium acid; abrupt smooth boundary.

A2–3 to 10 inches; dark grayish brown (10YR 4/2) gravelly loamy sand, black (10YR 2/1) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many fine, medium, and coarse roots; common fine interstitial pores; 15 percent pebbles, 5 percent cobbles; medium acid; clear smooth boundary.

Bw–10 to 13 inches; dark grayish brown (10YR 4/2) cobbly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots, few coarse roots; common fine interstitial pores; 12 percent pebbles, 8 percent cobbles; medium acid; abrupt wavy boundary.

R–13 inches; slightly weathered granitic rock.

Range in characteristics: The soil is 10 to 20 inches deep. Base saturation (acetate ammonium) is 5 to 30 percent throughout the profile. It is sand, loamy sand, sandy loam, fine sandy loam, or loam with 5 to 65 percent rock fragments.

LUMBERLY SERIES

The Lumberly series consists of moderately deep, well drained soils that formed in material weathered from granitic rock. These soils are on mountainsides. Slope ranges from 5 to 50 percent. Vegetation is the Red Fir series. Elevation is 6,000 to 8,000 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are coarse-loamy, mixed, frigid Typic Xerumbrepts.

Typical pedon of Lumberly gravelly coarse sandy loam is from a unit of Lumberly gravelly coarse sandy loam, 5 to 30 percent slopes, located on the south side of Old Highway 88, in the SW1/4NE1/4 of section 16, T. 8 N., R. 15 E., Peddler Hill quadrangle.

0–1 to 0 inches; leaf litter.

A1–0 to 5 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many fine interstitial pores; 15 percent pebbles, slightly acid; clear wavy boundary.

A2–5 to 10 inches; yellowish brown (10YR 5/4) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many fine interstitial pores; 19 percent pebbles; slightly acid; clear wavy boundary.

Bw–10 to 26 inches; light brown (7.5YR 6/4) gravelly coarse sandy loam, brown and dark brown (7.5YR 4/4) moist; weak moderate subangular blocky structure; soft, very friable, nonsticky, nonplastic; many fine and medium roots; many fine interstitial pores; 18 percent pebbles; slightly acid; clear wavy boundary.

BC–26 to 33 inches; reddish yellow (7.5YR 6/6) gravelly coarse sandy loam, strong brown (7.5YR 5/6) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 16 percent pebbles; slightly acid; clear wavy boundary.

Cr–33 inches; decomposed granodiorite.

Range in characteristics: The soil is 20 to 40 inches deep. Base saturation (ammonium acetate) is less than 20 percent throughout the profile. The soil is coarse sandy loam or sandy loam. Clay content averages 5 to 15 percent. Gravel content ranges from 5 to 25 percent and cobble content ranges from 0 to 10 percent. Reaction is slightly acid or medium acid throughout.

The A horizon has dry colors of 10YR 4/2, 4/3, 4/4, 5/2, 5/3, or 5/4. Moist colors are 7.5YR 3/2; 10YR 3/2, or 3/3.

The Bw horizon has dry colors of 7.5YR 5/4, 6/4; 10YR 4/4, 6/2, or 6/4. Moist colors are 7.5YR 3/4, 4/4; 10YR 3/4, or 4/3. The chroma or value is at least one unit higher than the A horizon. Some pedons have C horizons.

The Cr horizon is strongly weathered granitic rock that is easily dug by hand tools but retains the original rock structure. Root penetration is restricted with only a few extending along joints of fractures.

MARIPOSA SERIES

The Mariposa Series consists of shallow to moderately deep, well drained soils that formed in material weathered from vertically tilted schists, slate, and contact metamorphic rock. These soils are on mountainsides and ridgetops. Slope ranges from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 2,000 to 5,600 feet. The mean annual precipitation is 45 to 60 inches, some which falls as snow.

These soils are fine-loamy, mixed, mesic Ruptic-Lithic-Xerochreptic Haploxerults.

Typical pedon of Mariposa gravelly silt loam is from a unit of Mariposa-Jocal complex, 5 to 30 percent slopes, located on Poho Ridge, Georgetown Ranger District in the NE1/4SE1/4 of section 16, T. 11 N., R. 12 E., Slate Mountain quadrangle.

0–1/4 to 0 inches; traces of manzanita litter.

A–0 to 5 inches; strong brown (7.5YR 5/6) gravelly silt loam, dark brown (7.5YR 3/4) moist; strong fine granular structure; slightly hard, friable, nonsticky and slightly plastic; common very fine and fine roots; common very fine interstitial pores; 20 percent pebbles and 5 percent cobbles; medium acid; clear smooth boundary.

Bt1–5 to 20 inches; reddish yellow (5YR 6/6) gravelly silty clay loam, yellowish red (5YR 4/6) moist; strong coarse granular structure; slightly hard, firm, slightly sticky and slightly plastic; common thin clay films lining pores and on faces of peds; common fine roots, many medium roots; many very fine interstitial pores, common fine tubular pores; 10 percent pebbles and 5 percent cobbles; medium acid; gradual smooth boundary.

Bt2–20 to 30 inches; reddish yellow (5YR 6/6) gravelly silty clay loam, yellowish red (5YR 4/6) moist; strong medium subangular blocky structure; slightly hard, firm, slightly sticky and plastic; common moderately thick clay films lining pores and on faces of peds; few fine and medium roots; common very fine interstitial and tubular pores; 10 percent pebbles and 5 percent cobbles; medium acid; abrupt broken boundary.

R–30 inches; partly fractured and uptilted schist.

Range in characteristics: The soil is 10 to about 35 inches deep. The argillic horizon is interrupted intermittently by uptilted schist or slate. Rock fragments make up 15 to 30 percent of the soil by volume.

The A horizon has dry colors of 7.5YR 5/4, 5/6, or 10YR 5/4. Moist colors are 7.5YR 3/4, 4/2, 4/3, or 4/4. Reaction is slightly acid to strongly acid.

The B horizon has dry colors of 5YR 5/4, 5/6, 6/6; 7.5YR 5/6, or 6/6. Moist colors are 5YR 4/4, 4/6; 7.5YR 4/6, or 5/6. Reaction is medium acid to very strong acid. It is silty clay loam or clay loam. Base saturation (by sum of cations) is 10 to 30 percent at the base of the argillic horizon.

MAYMEN SERIES

The Maymen series consists of shallow, somewhat excessively drained soils that formed in material weathered from metasedimentary rock. These soils are on mountainsides and backslopes. Slope ranges from 2 to 100 percent. Vegetation is the Canyon Live Oak series. Elevation is 2,500 to 5,500 feet. The mean annual precipitation is 45 to 60 inches, some of which falls as snow.

These soils are loamy, mixed, mesic Dystric Lithic Xerochrepts.

Typical pedon of Maymen gravelly loam is from a unit of Mariposa-Maymen complex, 30 to 75 percent slopes, located in the American River Canyon, Georgetown Ranger District in the W1/2SW1/4 of section 15, T. 11 N., R. 12 E., Slate Mountain quadrangle.

0–1 to 0 inches; decomposing oak litter.

A–0 to 4 inches; pale brown (10YR 6/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many fine roots, common medium roots, many fine interstitial pores; 25 percent pebbles and 5 percent cobbles; medium acid; clear smooth boundary.

Bw–4 to 13 inches; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 4/4) moist; moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots, many medium roots, and few coarse roots; many fine interstitial pores; 25 percent pebbles and 8 percent cobbles; medium acid; gradual wavy boundary.

R–13 inches; partly fractured and uptilted slate.

Range in characteristics: The soil is 10 to 20 inches deep. Rock fragments make up 10 to 35 percent of the soil by volume, with most pedons having between 20 to 35 percent throughout the profile. Base saturation(ammonium acetate) is 20 to 50 percent throughout the profile. Reaction is slightly acid to very strongly acid and tends to become more acid with depth.

The A horizon has dry colors of 10YR 5/2, 5/4, 6/2 or 6/3. Moist colors are 10YR 3/2 or 3/3.

The Bw horizon has dry colors of 7.5YR 5/4, 6/4, or 6/6. Moist colors are 7.5YR 4/4 or 5/4. It is loam or silt loam.

McCARTHY SERIES

The McCarthy series consists of moderately deep, well drained soils that formed in material weathered from andesitic lahar. These soils are on mountainsides and on the tops and sides of volcanic tabular ridges. Slope ranges from 2 to 75 percent. Vegetaion is the Mixed Conifer-Pine series. Elevation is 2,000 to 6,000 feet. The mean annual precipitation is 45 to 60 inches, some of which falls as snow.

These soils are medial-skeletal, mesic Andic Xerumbrepts.

Typical pedon of McCarthy gravelly sandy loam is from a unit of McCarthy gravelly sandy loam, 2 to 30 percent slopes, 100 feet east of Dennis Road (Forest Service road 10N46), 1-1/4 miles south of Mormon Emigrant Trail, in the NE1/4SW1/4 of section 30, T. 10 N., R. 15 E., Leek Spring Hill quadrangle.

0–2 to 0 inches; litter and duff.

A1–0 to 5 inches; brown (7.5YR 4/4) gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; 20 percent pebbles and 2 percent cobbles; slightly acid; clear wavy boundary.

A2–5 to 22 inches; brown (7.5YR 5/4) very gravelly sandy loam, dark reddish brown (5YR 3/3) moist; moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine interstitial pores; 35 percent pebbles and 3 percent cobbles; slightly acid; clear wavy boundary.

Bt–22 to 26 inches; brown (7.5YR 5/4) very gravelly loam, dark reddish brown (5YR 3/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common thin clay films on surfaces of rock fragments; common fine and medium roots; common very fine interstitial and tubular pores; 45 percent pebbles and 5 percent cobbles; medium acid; clear wavy boundary.

Cr–26 inches; pale brown (10YR 6/3) volcanic breccia, slightly weathered and fractured with some roots and soil in the cracks.

Range in characteristics: The soil is 20 to 40 inches deep. The soil is gravelly or cobbly sandy loam or loam throughout. Base saturation (ammonium acetate) is 20 to 45 percent in the A horizon.

The A horizon is 7.5YR 3/2, 3/4, 4/2, 4/3, 4/4, 5/2, 5/4; 10YR 3/3, 4/2, 4/3, 4/4, 5/2, or 5/4. Moist colors are 5YR 2/2, 3/2, 3/3; 7.5YR 2/2, 3/2; 10YR 2/2, 3/2, or 3/3. It has 15 to 30 percent pebbles and 2 to 25 percent cobbles and stones Reaction is slightly acid or medium acid.

The Bt or Bw horizon is 10YR 5/4, 7.5YR 6/6, 5/4, 5/6, 4/4, 4/6; 5YR 4/4, 5/6, 4/6. Moist colors are 5YR 3/4, 4/4; 7.5YR 3/2, 3/4, 4/2, 4/4; 10YR 3/2, 3/3, 3/4, or 4/3. It has 35 to 75 percent pebbles, cobbles, and stones. Reaction is medium acid or strongly acid.

In mapping units 114, 115, and 179 the B horizon colors are outside of the range defined for the series and the McCarthy soil is formed in material weathered from rhyolitic tuff. These differences do not significantly affect the use or behavior of the soil.

MIERUF SERIES

The Mieruf series consists of deep, well drained soils formed in material weathered from metamorphosed sedimentary rock. These soils are on mountainsides. Slope ranges from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 4,800 to 6,000 feet. The mean annual precipitation is 50 to 65 inches, some of which falls as snow.

These soils are fine-loamy, oxidic, mesic Xeric Haplohumults.

Typical pedon of Mieruf very gravelly loam is from a unit of Hartless-Mieruf very gravelly loams, 5 to 30 percent slopes, located 1.3 miles due north of Deer Knob, 0.3 miles north of the intersection of Forest Service roads 12N39.1 and 12N52.1, near the northeast corner of the SW1/4 of section 5, T. 12 N., R. 14 E., Robbs Peak quadrangle.

0–1 to 0 inches; needles, twigs, and branches in various stages of decomposition.

A–0 to 6 inches; dark brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, loose, nonsticky and nonplastic; common very fine and fine roots, few medium roots; many very fine, and common fine interstitial and tubular pores; 40 percent pebbles; strongly acid; clear smooth boundary.

BA–6 to 13 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/4) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots, few medium and coarse roots; common very fine, and few medium interstitial and tubular pores; 20 percent pebbles; strongly acid; clear smooth boundary.

Bw1–13 to 25 inches; reddish yellow (7.5YR 6/6) gravelly loam, strong brown (7.5YR 4/6) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots, common fine, medium, and coarse roots; common very fine, and few fine and medium tubular pores; 20 percent pebbles; strongly acid; gradual smooth boundary.

Bw2–25 to 36 inches; reddish yellow (7.5YR 6/8) loam, strong brown (7.5YR 5/8) moist; moderate medium and coarse subangular blocky structure parting to weak fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine, fine, and coarse roots, common medium roots; common very fine and fine, and few medium tubular pores; 10 percent pebbles; very strongly acid; gradual smooth boundary.

Bw3–36 to 50 inches; reddish yellow (7.5YR 6/8) loam, strong brown (7.5YR 5/8) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots, common medium and coarse roots; common very fine, and few fine and medium tubular pores; strongly acid; gradual smooth boundary.

Cr–50 inches; soft fractured metamorphosed sedimentary rock; few very fine and fine roots follow fractures; fractures are less than 1/2 inch wide and are 4 to 10 inches apart.

Range in characteristics: The soil is 40 to 60 inches deep. Rock fragment content ranges from 0 to 40 percent throughout. Base saturation (ammonium acetate) is 2 to 25 percent throughout.

The A horizon has dry colors of 10YR 3/2, 3/4, 4/3, 4/4; 7.5YR 3/4, 4/4, or 5/4. Moist colors are is 10YR 2/2, 3/2, 3/3, 3/4; 7.5YR 3/2, 3/4, or 4/4. It is 3 to 7 inches thick. Clay content ranges from 15 to 25 percent. Reaction is medium acid to strongly acid.

The Bw horizon has dry colors of 10YR 5/4, 5/6, 6/6, 6/8; 7.5YR 5/4, 5/6, 6/8, 7/6; 5YR 4/6 or 5/6. Moist colors are 10YR 4/4, 4/6, 5/4, 5/6, 5/8; 7.5YR 4/4, 4/6, 5/6; 5YR 4/6 or 5/6. It is sandy loam, loam, silt loam, or their gravelly equivalents. Clay content ranges from 15 to 27 percent. Clay content averages 18 to 25 percent in the particle-size control section. Reaction is strongly acid to very strongly acid. Some pedons have a C horizon.

MUSICK SERIES

The Musick Series consists of very deep, well drained soils that formed in material weathered from granitic rock. These soils are on mountainsides. Slope ranges from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 2,500 to 5,000 feet. The mean annual precipitation is 40 to 60 inches, some of which falls as snow.

These soils are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Musick loam is from a unit of Holland-Musick loams, 5 to 30 percent slopes, located near Texas Creek, on the Georgetown R.D., in the NE1/4NE1/4 of section 32, T. 12 N., R. 12 E., Slate Mountain quadrangle.

0–2 to 0 inches; decomposing fir litter.

A–0 to 6 inches; brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/3) moist; moderate very fine and fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; 5 percent pebbles; slightly acid; gradual smooth boundary.

Bt1–6 to 24 inches; yellowish red (5YR 5/8) clay loam, red (2.5YR 4/6) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; common moderately thick clay films lining pores and on faces of peds; common very fine and medium roots; common very fine interstitial pores and few random tubular pores; 2 percent pebbles; slightly acid; gradual smooth boundary.

Bt2–24 to 43 inches; red (2.5YR 4/8) sandy clay loam, red (2.5YR 4/6, 2.5YR 4/8) moist; strong coarse subangular blocky structure; hard, firm, sticky and plastic; continuous thick clay films lining pores and on faces of peds; few fine and medium roots; common very fine interstitial pores and common random tubular pores; 2 percent pebbles; strongly acid; gradual wavy boundary.

Bt3–43 to 52 inches; yellowish red (5YR 5/8) sandy clay loam, red (2.5YR 4/6) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; common thin clay films on faces of peds; few fine and medium roots; common very fine interstitial pores and few random tubular pores; 12 percent pebbles; strongly acid; gradual smooth boundary.

BC–52 to 68 inches; yellowish red (5YR 5/8) gravelly sandy clay loam, red (2.5YR 4/8) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few medium roots; few very fine interstitial pores; 15 percent pebbles; strongly acid; diffused wavy boundary.

C–68 to 71 inches; strong brown (7.5YR 5/8) gravelly sandy loam, yellowish red (5YR 5/6) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine interstitial pores; 20 percent pebbles; strongly acid.

Range in characteristics: The soil is greater than 60 inches, and in many places is greater than 80 inches deep.

The A horizon has dry colors of 7.5YR 4/4, 5/4; 10YR 5/2 or 4/2. Moist colors are 5YR 3/3, 3/4; 7.5YR 3/2, 5/4, or 10YR 5/2. Reaction is slightly acid or medium acid. It is loam, sandy loam, or coarse sandy loam. A transitional A3 or B1 horizon is present in some pedons.

The Bt horizon has dry colors of 2.5YR 4/6, 6/6, 4/8, 5/8, or 5YR 5/6. Moist colors are 2.5YR 4/6, 4/8; 5YR 4/4, or 4/6. Reaction is medium acid or strongly acid. It is clay loam or sandy clay loam. Base saturation (by sum of cations) is 40 to 60 percent throughout. A transitional BC horizon may not be present.

The C horizon is 5YR 5/6, 5/8; 7.5YR 5/6, 5/8. It is loam, sandy loam, or coarse sandy loam, or their gravelly equivalents.

NEUNS SERIES

The Neuns series consists of moderately deep, well drained soils formed in material weathered from metasedimentary rock. These soils are on mountainsides. Slope ranges from 15 to 100 percent. Vegetation is the Mixed Conifer-Pine and Mountain Whitethorn series. Elevation is 2,400 to 6,000 feet. The mean annual precipitation is 50 to 65 inches, some of which falls as snow.

These soils are loamy-skeletal, mixed, mesic Dystric Xerochrepts.

Typical pedon of Neuns gravelly loam is from a unit of Neuns gravelly loam, 50 to 75 percent slopes, located 1.5 miles west southwest of Robbs Peak along a logging road about 400 feet east of Little Silver Creek, 500 feet east of the center of section 5, T. 12 N., R. 14 E., Robbs Peak quadrangle.

0 – 1 inch to 0; leaves, needles and twigs in various stages of decomposition mixed with pebbles and some cobbles, abrupt smooth boundary.

A1 – 0 to 3 inches; yellowish brown (10YR 5/6) gravelly loam, dark brown (7.5YR 3/4) moist; moderate very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, common fine roots; many very fine, and common fine interstitial pores; 20 percent pebbles and 5 percent cobbles; neutral; clear smooth boundary.

A2 – 3 to 12 inches; strong brown (7.5YR 5/6) very cobbly sandy loam, dark brown (7.5YR 3/4) moist; moderate very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium, and coarse roots; common very fine and fine tubular pores, few medium and coarse interstitial pores; 30 percent pebbles and 30 percent cobbles; strongly acid; gradual wavy boundary.

Bw1 – 12 to 23 inches; reddish yellow (7.5YR 6/6) very cobbly sandy loam, strong brown (7.5YR 4/6) moist; moderate coarse and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots, few coarse roots; common very fine and fine tubular pores and common fine and medium interstitial pores; 30 percent pebbles and 30 percent cobbles; very strongly acid; gradual irregular boundary.

Bw2 – 23 to 34 inches; reddish yellow (7.5YR 6/6) very cobbly sandy loam, strong brown (7.5YR 4/6) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and medium roots, few very fine and coarse roots; common very fine and few fine tubular pores, few fine and medium interstitial pores; 20 percent pebbles and 40 percent cobbles; very strongly acid; abrupt wavy boundary.

R – 34 inches; fractured metasedimentary rock, fractures range from 5 to 10 inches apart; common fine and medium roots and few coarse roots follow fractures.

Range in characteristics: The soil is 20 to 40 inches deep. Rock fragment content averages 35 to 60 percent in particle size control section. Chromas are either greater than 3 or values are greater than 5 below the upper 7 inches. Base saturation (ammonium acetate) is 25 to 50 percent throughout.

The A horizon has dry colors of 7.5YR 5/6, 6/4; 10YR 4/2 or 5/6. Moist colors are 7.5YR 3/2, 3/4; 10YR 2/2 or 3/2. Textures are gravelly loam, cobbly loam, or very cobbly loam. Reaction is medium acid or strongly acid.

The Bw horizon has dry colors of 7.5YR 5/4 or 5/6. Moist colors are 7.5YR 4/4 or 4/6. Textures are very gravelly sandy loam or very cobbly sandy loam. Reaction is strongly acid or very strongly acid.

NOTNED SERIES

The Notned series consists of very deep, well drained soils that formed in material weathered from granitic rock or coluvium or glacial material composed primarily of granitic rock. These soils are on mountainsides, glacial moraines, or outwash. Slope ranges from 2 to 50 percent. Vegetation is the Red Fir and Mixed Conifer-Fir series. Elevation is 5,600 to 8,500 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are loamy-skeletal, mixed, frigid Dystric Xerochrepts.

Typical pedon of Notned bouldery coarse sandy loam is a unit of Ledford-Notned complex, 30 to 50 percent slopes, located at the terminus of Strawberry Creek Road (Forest Service road 11N22) 3 1/2 miles southeast of Sciot Camp; in the E1/2NW1/4 of section 5, T. 10 N., R. 17 E., Echo Lake quadrangle.

0–3 to 0 inches; decomposing conifer litter.

A1–0 to 4 inches; dark brown (10YR 4/3) bouldery coarse sandy loam, dark brown (10YR 3/3) moist; strong medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine interstitial pores; 8 percent pebbles, 5 percent cobbles and 5 percent boulders; medium acid; clear smooth boundary.

A2–4 to 16 inches; dark yellowish brown (10YR 4/4) cobbly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; strong medium granular structure; soft, friable, nonsticky and nonplastic; many very fine and fine roots, common medium roots; many fine interstitial pores; 10 percent pebbles and 15 percent cobbles; medium acid; gradual wavy boundary.

Bw–16 to 35 inches; brown (7.5YR 4/4) very cobbly coarse sandy loam, dark brown (7.5YR 3/4) moist; moderate medium granular structure; soft, friable, nonsticky and nonplastic; common fine and medium roots, few coarse roots; common fine interstitial pores; 15 percent pebbles, 25 percent cobbles, and 5 percent stones; medium acid; gradual wavy boundary.

BC–35 to 46 inches; yellowish brown (10YR 5/4) very cobbly coarse sandy loam, dark brown (7.5YR 3/4) moist; moderate fine granular structure; loose, very friable, nonsticky and nonplastic; common fine and medium roots, few coarse roots; common very fine interstitial and tubular pores; 20 percent pebbles, 20 percent cobbles, and 10 percent stones; medium acid; clear wavy boundary.

C1–46 to 54 inches; brownish yellow (10YR 6/6) very cobbly loamy coarse sand, dark yellowish brown (10YR 4/6) moist; massive; loose, nonsticky and nonplastic; few fine and coarse roots; few fine interstitial pores; 30 percent pebbles, 15 percent cobbles, and 5 percent stones; strongly acid; clear wavy boundary.

C2–54 to 62 inches; very pale brown and yellow (10YR 7/4, 7/6) very cobbly loamy coarse sand, yellowish brown (10YR 5/4, 5/6) moist; massive; loose, nonsticky and nonplastic; few coarse roots; few fine interstitial pores; 20 percent pebbles, 20 percent cobbles, and 5 percent stones; medium acid.

Range in characteristics: The soil is 60 inches or more deep. Rock fragments average 35 to 65 percent throughout the control section. Typically, gravel, cobbles, stones, or boulders are all present. Chromas are greater than 3 either at the surface or within 3 to 9 inches of the surface. Base saturation (ammonium acetate) is 15 to 40 percent throughout the profile.

The A horizon has dry colors of 10YR 3/3, 4/2, 4/3, 4/4, 5/3, 5/4, 6/3 or 6/4. Moist colors are 7.5YR 3/2, 4/2; 10YR 2/2, 3/2, 3/3, or 3/4. It commonly is sandy loam or coarse sandy loam and less commonly loamy sand. It has 5 to 25 percent gravel, 5 to 30 percent cobbles, 0 to 20 percent stones, or 0 to 25 percent boulders. Reaction is slightly acid or medium acid.

The Bw horizon has dry colors of 7.5YR 4/4, 5/4, 6/3, 6/4; 10YR 5/4, 5/6 or 6/4. Moist colors are 7.5YR 3/4, 4/4; 10YR 3/4, 3/6, 4/3, 4/4, or 4/6. It is sandy loam or coarse sandy loam with 10 to 30 percent gravel, 10 to 25 percent cobbles, 0 to 25 percent stones, or 0 to 20 percent boulders. Reaction is slightly acid to strongly acid.

The C horizon has dry colors of 10YR 4/3, 5/4, 5/6, 6/4, 6/6, 7/2, 7/4 or 7/6. Moist colors are 10YR 3/4, 4/4, 4/6, 5/3, 5/4, or 5/6. It is loamy sand or loamy coarse sand with 15 to 30 percent gravel, 5 to 25 percent cobbles, 0 to 30 percent stones, or 0 to 10 percent boulders. It is neutral to strongly acid.

ORTHENTS

Orthents are shallow and moderately deep, well drained soils formed from material weathered from granitic rock. These soils are on mountainsides. Slope ranges from 10 to 40 percent. Vegetation is the Mountain Hemlock series. Elevation is 6,400 to 8,800 feet. The mean annual precipitation is 45 to 55 inches, most of which falls as snow.

Reference pedon of Orthents is from a unit of Orthents-Rock outcrop association, 10 to 40 percent; located south of Mokelumne Peak, Mokelumne Wilderness, in the NW1/4 of section 22, T. 8 N., R. 17 E., Mokelumne Peak quadrangle.

0–2 to 0 inches; fresh and decomposed litter.

A1–0 to 2 inches; dark grayish brown (10YR 4/2) loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable; common fine and medium roots; 5 percent pebbles; clear smooth boundary.

A2–2 to 6 inches; yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable; common medium and coarse roots; 5 percent pebbles, 5 percent cobbles; clear wavy boundary.

C1–6 to 18 inches; light yellowish brown (10YR 6/4) very cobbly loamy sand, dark yellowish brown (10YR 4/6) moist; weak moderate and coarse subangular blocky structure; loose, very friable; few medium and coarse roots; 25 percent pebbles, 20 percent cobbles; gradual wavy boundary.

C2–18 to 36 inches; brownish yellow (10YR 6/6) very cobbly loamy sand, yellowish brown (10YR 5/6) moist; massive; loose, very friable; few medium roots; 25 percent pebbles, 25 percent cobbles.

Cr–36 inches; weathered granitic rock.

Range in Charateristics: Orthents are 15 to 40 inches deep. They are loamy sand, coarse sandy loam, or sandy loam with 5 to 60 percent rock fragments. Chromas are either greater than 3 or values greater than 5 below the upper 7 inches.

PILLIKEN SERIES

The Pilliken series consists of deep, well drained soils that formed in material weathered from granitic rock. These soils are on mountainsides and ridgetops. Slope ranges from 5 to 75 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 3,000 to 6,000 feet. The mean annual precipitation is 40 to 65 inches, some which falls as snow.

These soils are coarse-loamy, mixed, mesic Entic Xerumbrepts.

Typical pedon of Pilliken coarse sandy loam is from a unit of Chaix-Pilliken coarse sandy loams, 30 to 75 percent slopes, located 1.4 miles east of the Silverfork Road junction with Highway 50 in the SW1/4SE1/4 of sec. 23. T. 11 N., R. 15 E., Kyburz quadrangle.

O–1 1/2 to 0 inches; decomposing conifer needles.

A1–0 to 8 inches; dark grayish brown (10YR 4/2) coarse sandy loam, black (10YR 2/1) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common fine roots, few medium roots; many fine interstitial pores; 5 percent pebbles; neutral; clear wavy boundary.

A2–8 to 16 inches; brown and yellowish brown (10YR 5/3, 10YR 5/4) coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 5 percent pebbles; neutral; clear smooth boundary.

AC–16 to 25 inches; pale brown (10YR 6/3) coarse sandy loam, brown (10YR 4/3) moist; moderate medium granular and subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots, common medium and coarse roots; many fine interstitial pores; 10 percent pebbles; neutral; abrupt smooth boundary.

C–25 to 58 inches; very pale brown (10YR 7/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; massive; loose, nonsticky and nonplastic; few medium roots; few fine interstitial pores; 20 percent pebbles; slightly acid; diffuse smooth boundary.

Cr–58 inches; highly weathered granodiorite.

Range in characteristics: The soil is 40 to 60 inches deep. Rock fragment content is 5 to 25 percent throughout the soil.

The A horizon has dry colors of 7.5YR 4/2; 10YR 4/2, 4/3, 5/1, 5/2, 5/3, or 5/4. Moist colors are 7.5YR 3/2; 10YR 2/1, 2/2, 3/2, or 3/3. Base saturation (ammonium acetate) in the A horizon is 25 to 40 percent. Reaction is neutral or slightly acid.

The C horizon has dry colors of 10YR 6/2, 6/3, 6/4, 6/6, 7/2, 7/3, or 7/4. Moist colors are 10YR 3/4, 4/3, 4/4, 4/6, 5/4, 5/6, or 6/4. It is coarse sandy loam, sandy loam, or loamy coarse sand or their gravelly equivalents. Reaction is slightly acid to strongly acid.

SITES SERIES

The Sites series consists of deep and very deep, well drained soils that formed in material weathered from metasedimentary rocks. These soils are on mountainsides and ridgetops. Slopes range from 5 to 30 percent. Vegetation is the Mixed Conifer-Pine series. Elevation is 3,400 to 3,800 feet. The mean annual precipitation is 50 to 60 inches, some of which falls as snow.

These soils are clayey, oxidic, mesic Xeric Haplohumults.

Typical pedon of Sites loam is from a unit of Jocal-Sites loams, 5 to 30 percent slopes, located 0.5 miles north of Soapweed in the SE1/4NE1/4 of section 31, T. 12 N., R. 12 E., Slate Mountain quadrangle.

0–1/2 to 0 inches; undecomposed pine needles and moss.

A–0 to 3 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; moderate fine and medium granular structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; common very fine and fine interstitial pores and few medium tubular pores; medium acid; abrupt smooth boundary.

BA–3 to 12 inches; yellowish red (5YR 4/6) clay loam, dark red (2.5YR 3/6) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine, fine, medium, and coarse roots; few very fine and fine interstitial pores and few medium tubular pores; strongly acid; clear smooth boundary.

Bt1–12 to 23 inches; red (2.5YR 4/8) clay, dark red (2.5YR 3/6) moist; moderate fine and medium subangular blocky structure; hard, very friable, sticky and plastic; common moderately thick clay films lining pores and on faces of peds; few very fine, fine, medium, and coarse roots; few very fine tubular pores; strongly acid; clear smooth boundary.

Bt2–23 to 44 inches; red (2.5YR 4/8) clay loam, dark red (2.5YR 3/6) moist; strong fine and medium angular blocky structure; hard, very friable, sticky and plastic; many moderately thick clay films lining pores and on faces of peds; few very fine, fine, medium, and coarse roots; few very fine tubular pores; very strongly acid; gradual smooth boundary.

BCt–44 to 60 inches; red (2.5YR 4/8) clay loam, dark red (2.5YR 3/6) moist; strong fine and medium angular blocky structure; hard, very friable, slightly sticky and plastic; many moderately thick clay films lining pores and on faces of peds; few very fine and fine roots; few very fine tubular pores; extremely acid.

Range in characteristics: The soil depth is 40 to over 60 inches. The particle size control section averages 40 to 50 percent clay and 0 to 10 percent rock fragments.

The A horizon has dry colors of 5YR or 7.5YR 4/4 or 5/4. Moist colors are 5YR or 7.5YR 3/4 or 4/4.

The Bt horizon has dry colors of 2.5YR or 5YR 4/6, 4/8, or 5/6. Moist colors are 2.5YR 3/6, 4/4, 4/6, 4/8; 5YR 4/4 or 4/6. It is clay loam or clay. It is strongly or very strongly acid. The base saturation (sum of cations) is 10 to 30 percent in the BCt horizon.

SMOKEY SERIES

The Smokey series consists of moderately deep, well drained soils formed in material weathered from metasedimentary rock. These soils are on mountainsides. Slopes range from 5 to 50 percent. Vegetation is the Red Fir series. Elevation is 5,800 to 7,900 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are loamy-skeletal, mixed, frigid Dystric Xerochrepts.

Typical pedon of Smokey gravelly loam is from a unit of Hangtown-Smokey complex, 5 to 30 percent slopes, located about 0.25 miles north of Robbs Peak Lookout about 500 feet east of Forest Service road 13N31, in the NE1/4 of the SE1/4 of section 33, T. 13 N., R. 14 E., Robbs Peak quadrangle.

0–1 inch to 0; leaves, needles and twigs in various stages of decomposition; mixed with gravel.

A–0 to 3 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots and common fine roots; common very fine, fine, medium, and coarse interstitial pores; 18 percent pebbles; medium acid; clear smooth boundary.

Bt–3 to 16 inches; light yellowish brown (10YR 6/4) very gravelly loam, brown (7.5YR 4/4) moist; weak fine and medium subangular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine and fine tubular and interstitial pores; few thin clay films lining pores and on faces of peds; 35 percent pebbles and 10 percent cobbles; strongly acid; clear irregular boundary.

C–16 to 34 inches; brownish yellow (10YR 6/6) very gravelly loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, friable, nonsticky and nonplastic; common medium and coarse roots; few very fine and fine tubular pores; 40 percent pebbles and 15 percent cobbles; strongly acid.

Cr–34 inches; weathered metasedimentary rock.

Range in characteristics: The soil is 20 to 40 inches deep. The particle-size control section has a content of 16 to 24 percent clay and 35 to 60 percent rock fragments. Base saturation (ammonium acetate) is assumed to be 30 to 50 percent throughout the profile.

The A horizon has dry colors of 7.5YR 4/3, 4/4, 5/4; 10YR 3/3, 4/3, or 5/3. Moist colors are 7.5YR 5/3, 5/4; 10YR 3/2 or 3/3. It is 3 to 6 inches thick. Gravel content ranges from 15 to 40 percent. Cobble content ranges from 0 to 10 percent. Reaction is slightly acid or medium acid.

The Bt horizon has dry colors of 7.5YR 4/4, 5/4, 6/4; 10YR 5/4, 5/6, 6/4, 6/6. Moist colors are 7.5YR 4/4, 5/4; 5YR 4/6 or 5/6. It is very gravelly or very cobbly loam or silt loam. Gravel content ranges from 30 to 55 percent. Cobble content ranges from 5 to 20 percent. Stone content ranges from 0 to 5 percent. Reaction is medium acid or strongly acid.

The C horizon has dry colors of 7.5YR 4/4; 10YR 6/3, 6/4, 6/6, or 7/6. Moist colors are 10YR 5/6, 6/3, 6/4, or 6/6. It is very gravelly or very cobbly loam or sandy loam. Gravel content ranges from 20 to 60 percent. Cobble content ranges from 5 to 20 percent. Reaction is strongly acid or very strongly acid.

TALLAC SERIES

The Tallac series consists of deep and very deep, moderately well drained soils that formed in material weathered from glacial deposits composed primarily of granitic rock. These soils are on lateral and terminal moraines and glacial outwash. Slope ranges from 2 to 75 percent. Vegetation is the Mixed Conifer-Fir and Huckleberry Oak series. Elevation is 5,400 to 7,000 feet. The mean annual precipitation is about 60 inches, most of which falls as snow.

These soils are loamy-skeletal, mixed, frigid Pachic Xerumbrepts.

Typical pedon of Tallac very cobbly sandy loam is from a unit of Gerle-Tallac complex, 5 to 30 percent slopes, located 20 feet west of the road through Barts Valley to Bunker Hill, 1,000 feet north of the turnoff to Wentworth Springs in the NE1/4NW1/4 of section 35, T. 14 N., R. 14 E., Bunker Hill quadrangle.

0–1 to 0 inches; pine and fir needle duff.

A1–0 to 4 inches; very dark grayish brown (10YR 3/2) very cobbly sandy loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, few fine roots; few very fine interstitial pores; 15 percent pebbles, 15 percent cobbles, 5 percent stones; medium acid; clear smooth boundary.

A2–4 to 20 inches; dark brown (10YR 3/3) very cobbly loam, very dark brown (10YR 2/2) moist; strong medium granular structure; soft, very friable, slightly sticky and nonplastic; common very fine, fine, and medium roots, few coarse roots; 20 percent pebbles, 20 percent cobbles, 10 percent stones; medium acid; gradual smooth boundary.

A3–20 to 29 inches; brown (10YR 4/3) very cobbly sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine roots; 25 percent pebbles, 20 percent cobbles, 5 percent stones, medium acid; clear smooth boundary.

C1–29 to 40 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and nonplastic; common fine roots, few medium roots; 35 percent gravels, 10 percent cobbles, 5 percent stones; slightly acid; clear wavy boundary.

C2–40 to 61 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; 30 percent gravels, 10 percent cobbles, 5 percent stones; slightly acid.

Range in characteristics: The soil is 40 to typically greater than 60 inches deep. It is sometimes underlain by a weakly cemented or compacted layer. Rock fragment content is 25 to 75 percent by volume throughout the profile. In the texture control section rock fragments are 35 to 75 percent by volume. Reaction is slightly acid or medium acid throughout.

The A horizon has dry colors of 10YR 3/2, 3/3, 4/2, 4/3 or 5/3. Moist colors are 10YR 2/1, 2/2, 3/2, or 3/3. It is greater than 20 inches thick. It is coarse sandy loam or sandy loam modified by gravels, cobbles, and stones. Base saturation (ammonium acetate) is 10 to 30 percent.

The C horizon has dry colors of 10YR 5/3, 5/4, 6/3 or 6/4. Moist colors are 10YR 3/2, 3/3, 3/4, 4/3, 4/4, or 5/4. It is very gravelly sandy loam, gravelly coarse sandy loam, very gravelly coarse sandy loam, or very gravelly coarse sandy loam.

TALLAC VARIANT

The Tallac Variant consists of moderately deep, well drained soils that formed in material weathered from metasedimentary rocks. These soils are on mountainsides. Slopes range from 15 to 50 percent. Vegetation is the Huckleberry Oak series. Elevation is 5,800 to 7,800 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are loamy-skeletal, mixed, frigid Pachic Xerumbrepts.

Typical pedon of Tallac Variant gravelly fine sandy loam is from a unit of Tallac Variant-Lithic Xerumbrepts-Rock outcrop complex, 15 to 50 percent slopes, located along the roadside 2,000 feet NE of the junction of the road to Bunker Hill Lookout and the road to Dellar Meadow in the SW1/4NE1/4 of section 23, T. 14 N., R. 14 E., Wentworth Springs quadrangle.

O–1 to 0 inches; leaf litter, partially decomposed.

A1–0 to 3 inches; dark brown (10YR 3/3) gravelly fine sandy loam, very dark brown (10YR 2/2) moist; strong fine, medium, and coarse granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few very fine discontinuous random irregular pores; 20 percent pebbles; medium acid; clear smooth boundary.

A2–3 to 14 inches; dark brown (10YR 3/3) very gravelly fine sandy loam, very dark brown (10YR 2/2), moist; strong fine and medium granular structure, soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; 30 percent pebbles, 10 percent cobbles; medium acid; gradual smooth boundary.

A3–14 to 23 inches; brown (10YR 4/3) very gravelly fine sandy loam, very dark brown (10YR 2/2), moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots, few coarse roots; 35 percent pebbles, 15 percent cobbles; medium acid, clear smooth boundary.

AC–23 to 34 inches; yellowish brown (10YR 5/4) very cobbly fine sandy loam, dark yellowish brown (10YR 3/4), moist; massive; soft, very friable, slightly sticky and nonplastic; many fine and medium roots, few coarse roots; 35 percent pebbles and 20 percent cobbles; medium acid; gradual smooth boundary.

C–34 to 38 inches; yellowish brown (10YR 5/6) very stony sandy loam, dark yellowish brown (10YR 3/4), moist; massive, soft, very friable, slightly sticky and nonplastic; few fine roots; 15 percent pebbles, 10 percent cobbles, and 20 percent stones; medium acid; abrupt wavy boundary.

R–38 inches; slightly fractured metasedimentary rock.

Range in characteristics: The soil is 20 to 40 inches deep. Some profiles have Bw horizons but most do not.

The A horizon has dry colors of 10YR 3/2, 3/3, 3/4 or 4/3. Moist colors are 10YR 2/2, 3/2, or 3/3. It is greater than 20 inches thick. Gravels content ranges from 20 to 35 percent. Cobbles content ranges from 5 to 15 percent. Base saturation (ammonium acetate) is 15 to 30 percent.

The C horizon has dry colors of 10YR 5/4 or 5/6. Moist colors are 7.5YR or 10YR 3/3, 3/4, or 4/4. It is sandy loam or fine sandy loam modified by gravel, cobbles and stones. Gravel content ranges from 15 to 35 percent. Cobble content ranges from 10 to 30 percent. Stone content ranges from 0 to 25 percent.

TINKER SERIES

The Tinker series consists of moderately deep, moderately well to well drained soils that formed in material weathered from glacial till. Tinker soils are on lateral and terminal moraines and glacial outwash. Slope ranges from 2 to 75 percent. Vegetation is the Huckleberry Oak, Mountain Whitethorn, or Lodgepole Pine series. Elevation is 5,400 to 9,500 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are loamy-skeletal, mixed, frigid Andic Haplumbrepts.

Typical pedon of Tinker is from a unit of Tinker very cobbly coarse sandy loam, 30 to 75 percent slopes, located 1/2 mile east of Schlein Ranger Station along Ice House Road in the NW1/4NW1/4 of section 19, T. 13 N., R. 15 E., Loon Lake quadrangle.

0–1 to 0 inches; partially decomposed leaf litter.

A1–0 to 3 inches; grayish brown (10YR 5/2) very cobbly coarse sandy loam, very dark grayish brown (10YR 3/2), moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; 20 percent pebbles, 10 percent cobbles, 5 percent stones, 5 percent boulders; slightly acid; clear smooth boundary.

A2–3 to 11 inches; brown (10YR 5/3) very cobbly coarse sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, few medium and coarse roots; few very fine interstitial pores; 20 percent pebbles, 10 percent cobbles, 5 percent stones, and 5 percent boulders; slightly acid; gradual smooth boundary.

A3–11 to 18 inches; yellowish brown (10YR 5/4) very cobbly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, few medium and coarse roots; few very fine interstitual pores; 20 percent pebbles, 10 percent cobbles, 5 percent stones, 5 percent boulders; slightly acid; gradual smooth boundary.

Bw–18 to 30 inches; light yellowish brown (10YR 6/4) very cobbly coarse sandy loam, dark yellowish brown (10YR 3/4), moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, few medium and coarse roots; few very fine interstitual pores; 25 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid; clear smooth boundary.

C1–30 to 36 inches; pale brown (10YR 6/3) very cobbly coarse sandy loam, brown (10YR 4/3) moist, few fine distinct brownish yellow (10YR 6/6) mottles; massive; hard, firm, nonsticky and nonplastic; few very fine and medium roots; few very fine interstitial pores; 20 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid; abrupt smooth boundary.

C2–36 to 41 inches; light yellowish brown (10YR 6/4) and light gray (2.5Y 7/2) weakly cemented or compacted very cobbly sandy loam, olive brown (2.5Y 4/4) and grayish brown (2.5Y 5/2), moist; massive; very hard, very firm, nonsticky and nonplastic; 20 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid.

Range in characteristics: The soil is 21 to 40 inches deep to a weakly cemented or compacted layer. The umbric epipedon is 10 to 19 inches in depth. Rock fragments range from 15 to 60 percent throughout the profile and the textural control section averages greater than 35 percent rock fragments by volume throughout. The clay mineral fraction contains high amounts of amorphous material.

The A horizon has dry colors of 10YR 3/2, 4/2, 5/2, 4/3, or 4/4. Moist colors are 10YR 2/1, 2/2, 3/2, or 3/3. It is sandy loam and coarse sandy loam. Reaction is slightly acid or medium acid. Base saturation (ammonium acetate) is 15 to 30 percent.

The Bw horizon has dry colors of 10YR 6/4, 6/3, or 5/6. Moist colors are 10YR 5/8, 4/6, or 3/4. It is loam, sandy loam, or coarse sandy loam modified by 35 to 60 percent rock fragments.

The C horizon has variable colors 10YR 5/4, 5/6, 6/3, 6/4, 7/1; 7.5YR 4/4, 5/6; 2.5YR 6/2, or 7/2. It is coarse sandy loam or sandy loam. The lower part of the C horizon is compacted or weakly cemented.

UMBREPTS

Umbrepts are somewhat poorly drained or moderately well drained soils that formed in alluvial material on the periphery of broad valley flats, along drainages, on moraines, and on glacial outwash. Slopes range from 0 to 75 percent. Vegetation is the Maple-Alder-Dogwood, Alder, and Sedge-Rush series. Elevation is 2,000 to 8,500 feet. The mean annual precipitation is 45 to 70 inches, some of which falls as snow.

Reference pedon for Umbrepts is from a unit of Aquepts and Umbrepts, 0 to 15 percent slopes, located along the Jones Fork of Silver Creek in the NE1/4NE1/4 of section 3, T. 11 N., R. 15 E., Kyburz quadrangle.

A1–0 to 12 inches; very dark grayish brown (10YR 3/2) fine sandy loam, black (10YR 2/1) moist; moderate coarse granular structure; common very fine and fine roots; 10 percent pebbles; medium acid; gradual irregular boundary.

A2–12 to 20 inches; brown (10YR 5/3) gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; few fine roots; 25 percent pebbles; medium acid; gradual irregular boundary.

C1–20 to 44 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; 60 percent pebbles; slightly acid; clear smooth.

C2–44 to 48 inches; very pale brown (10YR 7/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; 60 percent pebbles; slightly acid

Range in characteristics: The surface horizons have dry values of 5.5 or less and moist chromas and values less than 3.5. Textures range from clays to sandy loams, often as stratified layers. Permeability of the profile is slow to moderately slow and mottles are common in the lower subsoil horizons. Rock fragment content ranges from 5 to 70 percent.

WACA SERIES

The Waca series consists of moderately deep, well drained soils that formed in material weathered from andesitic lahar. These soils are on mountainsides. Slopes range from 5 to 50 percent. Vegetation is the Red Fir series. Elevation is 6,000 to 10,000 feet. The mean annual precipitation is 30 to 80 inches, most of which falls as snow.

These soils are medial-skeletal, frigid Andic Xerumbrepts.

Typical pedon of Waca cobbly sandy loam is from a unit of Waca-Windy complex, 5 to 30 percent slopes, located near Mule Canyon in the SW1/4SW1/4 of section 7, T. 10 N., R. 17 E., Caples Lake quadrangle.

0–1 to 0 inches; fir litter.

A1–0 to 3 inches; dark grayish brown (10YR 4/2) cobbly sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common fine interstitial pores; 10 percent pebbles, 5 percent cobbles; slightly acid; abrupt smooth boundary.

A2–3 to 8 inches; dark brown (10YR 3/3) gravelly sandy loam, very dark brown (10YR 2/2) moist; strong medium and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many fine interstitial pores; 20 percent pebbles, 5 percent cobbles; slightly acid; gradual smooth boundary.

A3–8 to 16 inches; brown (10YR 4/3) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; strong medium and coarse granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many fine interstitial pores; 25 percent pebbles, 15 percent cobbles; slightly acid; clear smooth boundary.

A4–16 to 27 inches; brown (10YR 4/3) very cobbly sandy loam, dark brown (7.5YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many fine interstitial pores; 40 percent pebbles, 20 percent cobbles; slightly acid; abrupt wavy boundary.

Cr–27 inches; weathered andesitic lahar.

Range in characteristics: The soil is 20 to 40 inches deep. The soil is considered to be Andic, with low bulk density and evidence of high amounts of amorphous material. Rock fragments occupy from 35 to 80 percent of the soil, by volume.

The A horizon has dry colors of 10YR 3/3, 4/2, 4/3, 5/2, 5/3, or 5/4. Moist colors are 7.5YR 3/2; 10YR 2/2, 3/2, or 3/3. It is thicker than 7 inches. It is coarse sandy loam or sandy loam. Reaction is slightly acid or medium acid. Base saturation (ammonium acetate) is 5 to 20 percent.

WINDY SERIES

The Windy series consists of deep and very deep, well drained soils that formed in material weathered from andesitic lahar. These soils are on mountainsides. Slopes range from 5 to 50 percent. Vegetation is the Red Fir series. Elevation is 6,000 to 8,500 feet. The mean annual precipitation is 55 to 70 inches, most of which falls as snow.

These soils are medial-skeletal, frigid Andic Xerumbrepts.

Typical pedon of Windy gravelly sandy loam is from a unit of Waca-Windy complex, 5 to 30 percent slopes, located along Foster Meadow Road in the NW1/4NW1/4 of section 7, T. 9 N., R. 16 E., Leek Springs quadrangle.

0–2 to 0 inches; leaf litter.

A1–0 to 7 inches; yellowish brown (10YR 5/4) gravelly sandy loam, black (10YR 2/1) moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots, common very fine roots; common very fine interstitial pores; 25 percent pebbles; slightly acid; clear wavy boundary.

A2–7 to 16 inches; dark brown and brown (10YR 4/3) very cobbly sandy loam, black (10YR 2/1) moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots, few medium roots; common very fine interstitial pores; 20 percent pebbles, 15 percent cobbles; slightly acid; clear wavy boundary.

BA–16 to 28 inches; dark brown and brown (10YR 4/3) extemely cobbly sandy loam, very dark grayish brown (10YR 3/2); strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common fine, medium, and coarse roots; common very fine interstitial pores; 30 percent pebbles, 35 percent cobbles; slightly acid; gradual wavy boundary.

Bw–28 to 46 inches; light yellowish brown (10YR 6/4) extremely cobbly sandy loam, dark brown (7.5YR 3/2) moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common fine, medium, and coarse roots; common fine interstitial pores; 45 percent pebbles, 30 percent cobbles; medium acid; clear wavy boundary.

C–46 to 62 inches; pale brown (10YR 6/3) extrememly cobbly sandy loam, dark brown (7.5YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; few fine and medium roots; common very fine interstitial pores; 40 percent pebbles, 30 percent cobbles; medium acid.

Range in characteristics: The soil is 40 to more than 60 inches deep. The soil is in an Andic subgroup with low bulk density and evidence of high amounts of amorphous material. Base saturation (ammonium acetate) is 5 to 20 percent throughout the profile. Rock fragments in the particle size control section range from 35 to 70 percent.

The A horizon has dry colors of 10YR 3/3, 4/3, 4/4, or 5/4. Moist colors are 7.5YR 2/2, 3/2; 10YR 2/1, 3/1, 3/2, or 3/3.

The Bw horizon has dry colors of 10YR 4/4, 5/6, or 6/4. Moist colors are 7.5YR 3/2, 3/4, or 3/6. It is sandy loam or loam. Reaction is slightly acid or medium acid. Some pedons do not have C horizons.

Xerumbrepts are moderately deep or deep, moderately well or well drained soils formed in glacially deposited material. These soils are on moraines, glacial till, or outwash terraces. Slope ranges from 5 to 50 percent. Vegetation is the Red Fir series. Elevation is 6,000 to 9,000 feet. The mean annual precipitation is 50 to 65 inches, most of which falls as snow.

Reference pedon for Xerumbrepts is from a unit of Xerumbrepts- Cryumbrepts, wet association 5 to 50 percent slopes, east of Fitz Ranch Bridge, Placerville Ranger District, in the center of section 26, T. 10 N., R. 16 E., Tragedy Springs quadrangle.

0–1 to 0 inches; fresh and decomposed litter.

A1–0 to 14 inches; very dark gray (10YR 3/1) very cobbly coarse sandy loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and medium roots; 15 percent pebbles, 30 percent cobbles; slightly acid; gradual wavy boundary.

A2–14 to 37 inches; brown (10YR 4/3) extremely cobbly coarse sandy loam, very dark gray (10YR 3/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine, medium, and coarse roots; 20 percent pebbles, 45 percent cobbles; medium acid; gradual wavy boundary.

A3–37 to 51 inches; brown (10YR 5/3) extremely cobbly coarse sandy loam, dark brown (10YR 3/3) moist; weak fine granular and some weak very fine subgranular; soft, friable, nonsticky and nonplastic; 30 percent pebbles, 45 percent cobbles; medium acid; gradual wavy boundary.

C–51 to 61 inches; brownish yellow (10YR 6/6) weakly cemented extremely cobbly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable; nonsticky and nonplastic; 30 percent pebbles, 45 percent cobbles; medium acid.

Range in characteristics: These soils are 20 to 60 inches deep, underlain by an intermittent weakly cemented or compacted layer over glacial till or outwash. They are sandy loam, coarse sandy loam, or loamy sand with rock fragments ranging from 15 to 80 percent. Values are darker than 3.5 when moist and 5.5 when dry, and chromas are less than 3.5 when moist in the upper 7 to 15 inches. Base saturation (ammonium acetate) is assumed to be 10 to 45 percent.

ZEIBRIGHT SERIES

The Zeibright series consists of deep or very deep, well drained soils that formed in material weathered from glacial deposits. These soils are on mountainsides and ridges, lateral and terminal moraines, and glacial outwash. Slope ranges from 2 to 75 percent. Vegetation is the Mixed Conifer-Pine and Mixed Conifer-Fir series. Elevation is 4,800 to 6,200 feet. The mean annual precipitation is 40 to 70 inches, some of which falls as snow.

These soils are loamy-skeletal, mixed, mesic Entic Xerumbrepts.

Typical pedon of Zeibright extremely gravelly coarse sandy loam is from a unit of Zeibright extremely gravelly coarse sandy loam, 2 to 30 percent slopes, located 200 yards south of Forest Service road 12N28, 1 mile northeast of Jones Place, 4.1 miles north of Ice House Resort in the NW1/4NE1/4SE1/4 of section 25, T. 12 N., R. 14 E., Kyburz quadrangle.

01–1 to 0 inches; oak leaf litter.

A–0 to 10 inches; dark grayish brown (10YR 4/2) extremely gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak very fine granular structure; loose, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine interstitial pores; 60 percent pebbles, 20 percent cobbles; neutral; clear smooth boundary.

AC–10 to 21 inches; brown (10YR 5/3) extremely cobbly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure grading to massive; loose, very friable, nonsticky and nonplastic; few very fine, fine, medium, and course roots; few fine interstitial pores; 35 percent pebbles and 30 percent cobbles; slightly acid; clear smooth boundary.

C1–21 to 35 inches; light yellowish brown (10YR 6/4) extremely cobbly coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, medium, and course roots; few very fine interstitial pores; 40 percent pebbles, 30 percent cobbles; medium acid; abrupt smooth boundary.

2C2–35 to 42 inches; brownish yellow (10YR 6/6) very cobbly coarse sandy loam, strong brown (7.5YR 5/8) moist; massive; hard, firm, nonsticky and nonplastic; few fine, medium, and coarse roots; very few thin clay films bridging mineral grains; 15 percent pebbles, 20 percent cobbles, and 10 percent stones; medium acid; abrupt smooth boundary.

3C3–42 to 61 inches; light yellowish brown (10YR 6/4) extremely stony coarse sandy loam, strong brown (7.5YR 5/6) moist; massive; soft, very friable, nonsticky and nonplastic; few fine, medium, and coarse roots; few very fine interstitial pores; 20 percent pebbles, 20 percent cobbles, and 30 percent stones; strongly acid.

Range in characteristics: The soil is 40 to greater than 60 inches deep. Rock fragments occupy 35 to 80 percent of the soil by volume. Base saturation (ammonium acetate) is 30 to 50 percent throughout the profile. Reaction is slightly acid to strongly acid throughout the profile.

The A horizon has dry colors of 10YR 3/3, 4/2, 4/3, 4/4, 5/2, or 5/3. Moist colors are 10YR 2/1, 2/2, 3/2, or 3/3. It is sandy loam with 10 to 65 percent gravel or 10 to 40 percent cobbles.

The C horizon has dry colors of 10YR 4/3, 4/4, 5/3, 5/4, 6/4, or 6/6. Moist colors are 10YR 3/3, 3/4, 4/3, 4/4, or 4/6. It is sandy loam or coarse sandy loam with 45 to 70 percent rock fragments, mostly in cobble and stone sizes.

Glossary

Alluvium. Material, such as sand, silt, and clay deposited by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity. The capacity of the soil to hold water available for use by most plants. It is expressed as total inches of water for the effective rooting depth or to 60 inches. The 4 classes and their ratings are: very low is less than 2 inches; low is 2 to 4 inches; moderate is 4 to 8 inches; and high is more than 8 inches.

Backslopes. The geomorphic component that forms the steepest inclined surface and principal element of many mountainsides. Backslopes in profile are commonly steep, linear, and may or may not include cliff segments.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of calcium, magnesium, sodium, and potassium), expressed as a percentage of the total cation exchange capacity.

Bedrock. A generalization for the rock, usually solid, that underlies the soil or other unconsolidated, superficial material.

Boulder. Rock fragments larger than 24 inches in diameter.

Bulk density, soil. The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to constant weight at 105 degrees centigrade. A unit of measure, usually grams per cubic centimeter, megagrams per cubic meter, or pounds per square foot.

Canyon. A long, deep, narrow, very steep-sided valley with high and precipitous walls in an area of high local relief.

Cation-exchange capacity. The sum total of exchangeable cations that a soil can absorb (sometimes called total-exchange capacity, base-exchange capacity, or cation absorption capacity), expressed in milliequivalents per 100 grams of soil or of other absorbing material, such as clay.

Cemented. Having a hard, brittle consistency because the particles are held together by cementing substances such as humus, calcium carbonate, or the oxides of silicon, iron, and aluminum.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate, or lining pores or root channels. Synonyms: clay skin, cutans.

Coarse textures. Sand or loamy sand.

Cobbles. Rounded or partially rounded fragments of rock 3 to 10 inches in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Consistence, soil. The feel of the soil and ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose. Noncoherent when dry or moist; does not hold together in a mass.

Friable. When moist, crushes easily under pressure between thumb and forefinger and can be pressed together into a lump.

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic. When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky. When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard. When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft. When dry, breaks into powder or individual grains under very slight pressure.

Cemented. Hard; little affected by moistening.

Culmination of mean annual increment (CMAI). The point where a conifer stand reaches its maximum annual rate of growth. The mean annual increment is computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase.

Dark surface layer. Meets the color requirements for a umbric epipedon.

Deep. As a soil depth classification, 40 to 60 inches.

Drainage class. Drainage class refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage. Seven classes of natural soil drainage are recognized:

Excessively drained. Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained. Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained. Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained. Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained. Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained. Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artifically drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained. Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artifically drained, most mesophytic plants cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Effective rooting depth. The vertical distance from the soil surface to bedrock or any other layer that stops or hinders the penetration of roots.

Epipedon. Soil horizons that form at the surface. It is either darkened by organic matter or eluviated, or both.

Erosion. The wearing away of the land surface by wind, water, ice, and other geological agents.

Erosion hazard, maximum. This is an assessment of the relative hazard of the loss of surface soil in an average year assuming no vegetative cover and no soil disturbance. The ratings are low, moderate, high, and very high.

Flood plain. The land bordering a stream, built up of sediments from overflow of the stream and subject to inundation when the stream is at flood stage.

Granitic rock. A textural term applied to coarse and medium grained, granular igneous rocks in which all or nearly all of the mineral consitituents are anhedral and of approximately the same size. Granite and granodiorite are granitic rocks.

Gravel. Rounded or angular rock fragments less than 3 inches in diameter; an individual piece is a pebble.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil forming processes. The major horizons are as follows:

O horizon. An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon. The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon. The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer. Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Igneous rock. Rock that has formed by the cooling and solidification of magma and that has not been changed appreciably since its formation.

Infiltration. The downward entry of water into the immediate surface of the soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Lahar. Landslide or mudflow of pyroclastic material on the flank of a volcano. These deposits may be andesitic or basaltic in mineralogy.

Lithic contact. The boundary between soil and underlying rock which is a barrier to root penetration and water movement. Rock is essentially unweathered and can only be chipped by a spade.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Mapping unit. A kind of soil, a combination of kinds of soil, or miscellaneous land types that are delineated on the soil map.

Metamorphic rock. Rock derived from pre-existing rocks but that differ from them in physical, chemical, and mineralogical properties as a result of natural geological processes, principally heat and pressure, originating within the earth. The pre-existing rocks may have been igneous, sedimentary, or another form of metamorphic rock. Synonym: metasedimentary rock.

Moderately deep. As a soil depth classification, between 20 and 40 inches.

Moraine. An accumulation of drift, with an initial topographic expression of its own, built within a glaciated region, chiefly by the direct action of glacial ice. Examples are ground, lateral, recessional, and terminal moraines.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and impeded drainage.

Mountainside. The sloping surface which forms the side of a mountain.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash. Stratified sand and gravel produced by glaciers and carried, sorted, and depositied by water that originated mainly from the melting of glacial ice. Outwash deposits may occur in the form of valley fills (outwash terraces) or as widespread outwash plains.

Pan. A layer in a soil that is firmly compacted or very rich in clay. Frequently the word "pan" is combined with other words that more explicitly indicate the nature of the layers; for example, hardpan or duripan, fragipan, claypan, and plowpan.

Paralithic contact. The boundary between soil and underlying weathered rock which is a barrier to root penetration and water movement. Material retains rock structure but when moist can be dug with a spade.

Parent material. The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of soils is developed by pedogenic processes.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block.

Pedon. The smallest volume that can be called "a soil". A pedon is three dimensional and large enough to permit a study of all horizons. Its area ranges from about 1 square yard to 10 square yards, depending on the variability of the soil.

Permeability. The quality of the soil that enables water to move downward through the profile.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction. A measure of acidity or alkalinity of the soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as: Extremely acid, below 4.5; Very strongly acid, 4.5-5.0; Strongly acid, 5.1-5.5; Medium acid, 5.6-6.0; Slightly acid, 6.1-6.5; Neutral, 6.6-7.3; Mildly alkaline, 7.4-7.8; Moderately alkaline, 7.9-8.4; Strongly alkaline, 8.5-9.0; and Very strongly alkaline, higher than 9.0.

Ridge. A long, narrow elevation of the land surface, commonly sharp crested with steep sides and forming an extended upland between valleys.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The texture class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Sediment. Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Shallow. As a soil depth classification, less than 20 inches.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slope. The inclination of the land surface from the horizontal. Percentage of slopes is the vertical distance divided by horizontal distance, then multiplied by 100.

Soil series. The basic unit of soil classification, being a subdivision of a family and consisting of soils which are essentially alike in all major profile characteristics except the texture of the A horizon.

Soil variant. A soil having properties sufficiently different from other known soils to justify a new series name but making up such a limited geographic area that establishing a new series is not justified.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stones. Detached rock fragments. If rounded, they are more than 10 inches in diameter, or if flattened, more than 17 inches along the long axis.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structures are: platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grain (each grain by itself, as in dune sand) or massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans.)

Subsoil. The soil between the surface layer and the uppermost substratum. All parts of B horizon above 80 inches, and any parts of A or C horizons between the surface layer and 40 inches or a more shallow substratum, are subsoil.

Subsoil strength. The load-supporting capacity of the subsoil. The strength of a subsoil can vary under different conditions of moisture and density. Methods for determining are dependent of test of cohesion, internal friction, and shear.

Substratum. A layer below 40 inches, or beneath the solum if the lower part of the solum is between 40 and 80 inches deep. Any parts of the solum below 80 inches are substrata. Bedrock, hardpan, and unconsolidated geologic materials that are in contrasting particle size classes relative to the surface soil or solum are substrata regardless of depth.

Summer range. Perennial grasslands, mountain meadows, and resprouting plants in clearcut units grazed during summer months.

Surface layer. The uppermost part of the soil, usually designated as the A horizon, equivilent to the depth of soil moved in tillage and ranging in depth from 3 to 10 inches. Depth may be greater in some forest soils.

Tabular ridges, volcanic. A flat topped linear ridge formed from andesitic lahars from the Mehrten Formation

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, or lake. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Till. Unstratified glacial drift deposited directly by the ice and consisting of clay, sand, gravel, and boulders intermingled in any proportion.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Tables

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
101	II e	Aiken	2e	2	Moderate	Slight	Slight	Moderate	Slight	2 - 5 5 - 25 25 - 30	Low Moderate High
		Cohasset	2e	1 - 2	Moderate	Slight	Slight	Moderate	Slight	2 - 5 5 - 25 25 - 30	Low Moderate High
102	III Epg	Andic Cryumbrepts	3 Ep	Not Rated	Moderate	Not Rated	Moderate	Moderate	Moderate	15 - 20 20 - 45 45 - 50	Moderate High Very High
		Lithic Cryumbrepts	4 ED	7	Moderate	Not Rated	Moderate	Severe	Severe	15 -2 0 20 - 45 45 - 50	Moderate High Very High
103	Not Rated	Aquepts	Not Rated	Not Rated	Severe	Not Rated	Slight	Severe	Moderate	0 - 5 5 - 15	Low Moderate
		Umbrepts	Not Rated	Not Rated	Moderate	Not Rated	Slight	Severe	Slight	0 - 5 5 - 15	Low Moderate
104	IV EpG	Big Hill	4 Ep	2 - 4	Severe	Moderate	Moderate	Moderate	Slight	50 - 65 65 - 75	High Very High
		Musick	4 E	2 - 3	Severe	Moderate	Slight	Slight	Slight	50 - 60 60 - 75	High Very High
105	II exp	Bighill	2 ep	2 - 4	Slight	Moderate	Slight	Moderate	Slight	5 - 15 15 - 30	Low Moderate
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
		Dome	2 ep	3	Slight	Severe or Moderate	Slight	Moderate	Slight	5 - 15 15 - 30	Low Moderate
106	IV EpG	Chaix	4 Ep	4 - 5	Severe	Severe or Moderate	Moderate	Severe	Moderate	30 - 65 65 - 75	High Very High
107	IIep	Chaix	2 ep	4 - 5	Slight	Severe or Moderate	Slight	Severe	Slight	5 - 15 15 - 30	Low Moderate
		Pilliken	2 ep	3	Slight	Moderate	Slight	Moderate	Slight	0 - 20 20 - 30	Low Moderate

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
108	IV EpG	Chaix	4 Ep	4 - 5	Severe of Moderate	Severe or Moderate	Moderate	Severe	Moderate	30 - 60 60 - 75	High Very High
		Pilliken	4 Ep	3	Severe or Moderate	Moderate	Moderate	Moderate	Slight	30 - 60 60 - 75	High Very High
109	IV EXpG	Chaix	4 Ep	4 - 5	Severe or Moderate	Severe or Moderate	Moderate	Severe	Moderate	30 - 55 55 - 75	High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
110	II e	Cohasset	2 e	1 - 2	Moderate	Slight	Slight	Moderate	Slight	2 - 5 5 - 25 25 - 30	Low Moderate High
111	II e	Cohasset	2 e	1 - 2	Moderate	Slight	Slight	Moderate	Slight	2 - 5 5 - 25 25 - 30	Low Moderate High
		Hartless Variant	2 ep	3	Slight	Severe	Moderate	Moderate	Slight	2 - 20 20 - 30	Low Moderate
112	II e	Cohasset	2 e	1 - 2	Moderate	Slight	Slight	Moderate	Slight	2 - 5 5 - 25 25 - 30	Low Moderate High
		McCarthy	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	2 - 15 15 - 30	Low Moderate
113	III Eg	Cohasset	3 E	1 - 2	Moderate	Slight	Slight	Moderate	Slight	30 - 50	High
		McCarthy	3 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 50	High
114	II e	Cohasset, rhyolitic	2 e	1 - 2	Moderate	Slight	Slight	Moderate	Slight	5 - 20 20 - 30	Low Moderate
		McCarthy, rhyolitic	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 25 25 - 30	Moderate High
115	IV EpG	Cohasset, rhyolitic	4 E	1 - 2	Severe or Moderatre	Slight	Slight	Moderate	Slight	30 - 70 70 - 75	High Very High
		McCarthy, rhyolitic	4 Ep	3 - 4	Severe or Moderate	Moderate	Slight	Moderate	Moderate	30 - 65 65 - 75	High Very High

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
116	II e	Crozier	2 e	3 - 4	Slight	Slight	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
		Cohasset	2 e	1 - 2	Moderate	Slight	Slight	Moderate	Slight	2 - 5 5 - 25 25 - 30	Low Moderate High
117	III Eg	Crozier	3 E	3 - 4	Moderate	Slight	Slight	Moderate	Slight	30 - 50	High
		Cohasset	3 E	1 - 2	Moderate	Slight	Slight	Moderate	Slight	30 - 50	High
118	II e	Crozier	2 e	3 - 4	Slight	Slight	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
		McCarthy	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 15 15 - 30	Low Moderate
119	III Eg	Crozier	3 E	3 - 4	Moderate	Slight	Slight	Moderate	Slight	30 - 50	High
		McCarthy	3 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 50	High
120	III Epg	Cryumbrepts	3 Ep	Not Rated	Severe or Moderate	Not Rated	Moderate	Moderate	Slight	5 - 10 10 - 30 30 - 50	Low Moderate High
		Cryumbrepts, wet	4 EW	Not Rated	Severe	Not Rated	Slight	Moderate	Moderate	5 - 10 10 - 30 30 - 50	Low Moderate High
121	II ep	Dome	2 ep	3	Slight	Severe or Moderate	Slight	Moderate	Slight	2 - 20 20 - 30	Low Moderate
122	II ep	Dome	2 ep	3	Slight	Severe or Moderate	Slight	Moderate	Slight	2 - 20 20 - 30	Low Moderate
		Zeibright	3 eP	3 - 4	Slight	Severe or Moderate	Moderate	Moderate	Slight	2 - 20 20 - 30	Low Moderate
123	III Epg	Dome	3 Ep	3	Moderate	Severe or Moderate	Moderate	Moderate	Slight	30 - 50	High
		Zeibright	3 EP	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Moderate	30 - 50	High

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
124	II pw	Dome Variant	2 pw	3 - 4	Moderate	Moderate	Slight	Moderate	Moderate	0 - 10	Low
125	Not Rated	Fluvents	Not Rated	Not Rated	Moderate or Slight	Not Rated	Slight	Moderate	Moderate	0 - 10	Low
126	II ep	Gerle	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	2 - 20 20 - 30	Low Moderate
127	II ep	Gerle	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	2 - 20 20 - 30	Low Moderate
		Notned	3 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	2 - 20 20 - 30	Low Moderate
128	II ep	Gerle	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	2 - 20 20 - 30	Low Moderate
		Tallac	3 eP	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Slight	2 - 20 20 - 30	Low Moderate
129	III Epg	Gerle	3 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Slight	30 - 50	High
		Tallac	3 eP	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Slight	30 - 50	High
130	II ewp	Gerle	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	2 - 15	Low
		Umbrepts	2 ew	Not Rated	Moderate	Severe	Slight	Severe	Slight	2 - 15	Low
131	IV EPg	Hangtown	3 Ep	3 - 4	Moderate or Slight	Moderate	Moderate	Severe	Slight	15 - 25 25 - 50	Moderate High
		Lithic Xerumbrepts	4 EP	7	Moderate or Slight	Severe	Moderate	Severe	Moderate	15 - 20 20 - 45 45 - 50	Moderate High Very High
132	II ep	Hangtown	2 ep	3 - 4	Slight	Moderate	Slight	Severe	Slight	5 - 20 20 - 30	Low Moderate
		Smokey	2 ep	3 - 4	Slight	Severe or Moderate	Slight	Severe	Moderate	5 - 25 25 - 30	Moderate High
133	III Epg	Hangtown	3 Ep	3 - 4	Moderate	Moderate	Moderate	Severe	Slight	30 - 50	High
		Smokey	3 Ep	3 - 4	Moderate	Severe or Moderate	Slight	Severe	Moderate	30 - 50	High

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
134	II ep	Hartless	2 ep	3 - 4	Slight	Severe	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
135	III Epg	Hartless	3 Ep	3 - 4	Moderate	Severe	Moderate	Moderate	Slight	30 - 50	High
136	II ep	Hartless	2 ep	3 - 4	Slight	Severe	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
		Mieruf	2 ep	3 - 4	Moderate	Moderate	Slight	Severe	Slight	5 - 25 25 - 30	Moderate High
137	III Epg	Hartless	3 Ep	3 - 4	Moderate	Severe	Moderate	Moderate	Slight	30 - 50	High
		Mieruf	3 Ep	3 - 4	Moderate	Moderate	Moderate	Severe	Slight	30 - 50	High
138	IV EpG	Hartless	4 Ep	3 - 4	Severe	Severe	Moderate	Moderate	Slight	50 - 60 60 - 75	High Very High
		Mieruf	4 Ep	3 - 4	Severe	Moderate	Moderate	Severe	Slight	50 - 60 60 - 75	High Very High
139	II ep	Hartless	2 ep	3 - 4	Slight	Severe	Slight	Moderate	Slight	15 - 25 25 - 30	Moderate High
		Neuns	3 Ep	3 - 5	Slight	Severe or Moderate	Slight	Severe	Moderate	15 - 25 25 - 30	Moderate High
140	IV EpG	Hartless	4 Ep	3 - 4	Severe or Moderate	Severe	Moderate	Moderate	Slight	30 - 60 60 - 75	High Very High
		Neuns	4 Ep	3 - 5	Severe or Moderate	Severe or Moderate	Moderate	Severe	Moderate	30 - 60 60 - 75	High Very High
141	III Epg	Hartless Variant	3 Ep	3	Moderate	Severe	Moderate	Moderate	Slight	30 - 50	High
142	II e	Holland	2 e	2 - 3	Moderate	Slight	Slight	Slight	Slight	5 - 25 25 - 30	Moderate High
143	III Eg	Holland	3 E	2 - 3	Moderate	Slight	Slight	Slight	Slight	30 - 50	High
144	II e	Holland	2 e	2 - 3	Moderate	Slight	Slight	Slight	Slight	5 - 25 25 - 30	Moderate High
		Bighill	2 ep	2 - 4	Slight	Moderate	Slight	Moderate	Slight	5 - 15 15 - 30	Low Moderate

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
145	IV EG	Holland	4 E	2 - 3	Severe or Moderate	Slight	Moderate	Slight	Slight	30 - 60 60 - 75	High Very High
		Bighill	4 Ep	2 - 4	Severe or Moderate	Moderate	Moderate	Moderate	Slight	30 - 60 60 - 75	High Very High
146	II e	Holland	2 e	2 - 3	Moderate	Slight	Slight	Slight	Slight	5 - 25 25 - 30	Moderate High
		Musick	2 e	2 - 3	Moderate	Moderate	Slight	Slight	Slight	5 - 25 25 - 30	Moderate High
147	III Eg	Holland	3 E	2 - 3	Moderate	Slight	Slight	Slight	Slight	30 - 50	High
		Musick	3 E	2 - 3	Moderate	Slight	Slight	Slight	Slight	30 - 50	High
148	II e	Holland	2 e	2 - 3	Moderate	Slight	Slight	Slight	Slight	5 - 25 25 - 30	Moderate High
		Pilliken	2 ep	3	Slight	Moderate	Slight	Moderate	Slight	5 - 15 15 - 30	Low Moderate
149	III Eg	Holland	3 E	2 - 3	Moderate	Slight	Slight	Slight	Slight	30 - 50	High
		Pilliken	3 Ep	3	Moderate	Moderate	Moderate	Moderate	Slight	30 - 50	High
150	II e	Jocal	2 e	2 - 3	Moderate	Slight	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
151	III Eg	Jocal	3 E	2 - 3	Moderate	Slight	Slight	Moderate	Slight	30 - 50	High
152	II e	Jocal	2 e	2 - 3	Moderate	Slight	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
		Hartless	2 ep	3 - 4	Slight	Severe	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
153	III Eg	Jocal	3 E	2 - 3	Moderate	Slight	Moderate	Moderate	Slight	30 - 50	High
		Hartless	3 Ep	3 - 4	Moderate	Severe	Moderate	Moderate	Slight	30 - 50	High
154	IV EwG	Jocal	4 E	2 - 3	Severe or Moderate	Slight	Moderate	Moderate	Slight	30 - 60 60 - 75	High Very High
		Mariposa	4 Ed	4 - 5	Severe or Moderate	Moderate or Slight	Moderate	Moderate	Moderate	30 - 35 35 - 75	High Very High
		Umbrepts	4 Ew	Not Rated	Severe or Moderate	Moderate	Moderate	Severe	Slight	30 - 70 70 - 75	High Very High

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
155	II e	Jocal	2 e	2 - 3	Moderate	Slight	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
		Sites	2 e	3 - 4	Moderate	Slight	Slight	Slight	Slight	5 - 25 25 - 30	Moderate High
156	III epg	Ledford	3 ep	2 - 3	Moderate or Slight	Moderate	Slight	Moderate	Slight	15 - 30 30 - 50	Moderate High
157	II ep	Ledford	2 ep	2 - 3	Slight	Moderate	Slight	Moderate	Slight	5 - 20 20 - 30	Low Moderate
		Notned	3 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	5 - 20 20 - 30	Low Moderate
158	III epg	Ledford	3 ep	2 - 3	Moderate	Moderate	Slight	Moderate	Slight	30 - 50	High
		Notned	4 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Slight	30 - 50	High
159	III exP	Ledmount	3 eP	7	Slight	Severe	Slight	Severe	Moderate	2 - 10 10 - 30	Low Moderate
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
160	IV XPG	Ledmount	4 EP	7	Severe or Moderate	Severe	Moderate	Severe	Severe	30 - 40 40 - 75	High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
161	IV EDG	Lithic Cryumbrepts	4 ED	7	Severe or Slight	Severe	Moderate	Severe	Severe	15 - 25 25 - 45 45 - 75	Moderate High Very High
162	III eD	Lithic Cryumbrepts	3 eD	7	Slight	Severe	Slight	Severe	Severe	5 - 10 10 - 30	Low Moderate
		Waca	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 10 10 - 30	Low Moderate
163	IV EDg	Lithic Cryumbrepts	4 ED	7	Moderate	Severe	Moderate	Severe	Severe	30 - 45 45 - 50	High Very High
		Waca	3 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 40 45 - 50	High Very High

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
164	IV XPG	Lithic Xerumbrepts	4 EP	7	Severe to Slight	Severe	Moderate	Severe	Severe	15 - 40 40 - 75	High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
165	II ep	Lumberly	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	5 - 15 15 - 30	Low Moderate
166	III Epg	Lumberly	3 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Slight	30 - 50	High
167	II ed	Mariposa	2 ed	4 - 5	Slight	Severe or Moderate	Slight	Moderate	Moderate	5 - 10 10 - 30	Moderate High
168	III Edg	Mariposa	3 Ed	4 - 5	Moderate	Severe or Moderate	Slight	Moderate	Moderate	30 - 35 35 - 50	High Very High
169	II ed	Mariposa	2 ed	4 - 5	Slight	Severe or Moderate	Slight	Moderate	Moderate	5 - 10 10 - 30	Moderate High
		Jocal	2 e	2 - 3	Moderate	Slight	Slight	Moderate	Slight	5 - 25 25 - 30	Moderate High
170	IV EdG	Mariposa	4 Ed	4 - 5	Severe or Moderate	Severe or Moderate	Moderate	Moderate	Moderate	30 - 35 35 - 75	High Very High
		Jocal	4 E	2 - 3	Severe or Moderate	Slight	Moderate	Moderate	Slight	30 - 60 60 - 75	High Very High
171	II ed	Mariposa	2 ed	4 - 5	Slight	Severe or Moderate	Slight	Moderate	Moderate	2 - 10 10 - 30	Moderate High
		Maymen	2 ed	6 - 7	Slight	Severe	Slight	Severe	Moderate	2 - 20 20 - 30	Moderate High
172	IV EdG	Mariposa	4 Ed	4 - 5	Severe or Moderate	Severe or Moderate	Moderate	Moderate	Moderate	30 - 75	Very High
		Maymen	4 Ed	6 - 7	Severe or Moderate	Severe or Moderate	Moderate	Severe	Moderate	30 - 45 45 - 75	High Very High
173	IV ExdG	Maymen	4 Ed	6 - 7	Severe or Moderate	Severe or Moderate	Moderate	Severe	Moderate	30 - 40 40 - 75	High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
174	IV ExdG	Maymen	4 Ed	6 - 7	Severe	Severe or Moderate	Moderate	Severe	Moderate	75 - 100	Very High
		Rock Outcrop	4 Ed	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
175	II ep	McCarthy	2 ep	3 - 4	Slight	Moderate	Moderate	Moderate	Moderate	2 - 15 15 - 30	Low Moderate
176	III Epg	McCarthy	3 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 50	High
177	II ep	McCarthy	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	2 - 10 10 - 30	Low Moderate
		Ledmount	3 eP	7	Slight	Severe	Slight	Severe	Moderate	2 - 10 10 - 30	Low Moderate
178	IV EpG	McCarthy	4 Ep	3 - 4	Severe or Moderate	Moderate	Moderate	Moderate	Moderate	30 - 45 45 - 75	High Very High
		Ledmount	4 EP	7	Severe or Moderate	Severe	Moderate	Severe	Severe	30 - 45 45 - 75	High Very High
179	IV ExpG	McCarthy	4 Ep	3 - 4	Severe to Slight	Moderate	Moderate	Moderate	Moderate	15 - 30 30 - 65 65 - 75	Moderate High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
180	II ep	Mieruf	2 ep	3 - 4	Slight	Moderate	Slight	Severe	Slight	5 - 25 25 - 30	Moderate High
181	III Epg	Mieruf	3 Ep	3 - 4	Moderate	Moderate	Moderate	Severe	Slight	30 - 50	High
182	III Ep	Neuns	3 Ep	3 - 5	Slight	Severe or Moderate	Slight	Severe	Moderate	15 - 25 25 - 30	Moderate High
183	III Epg	Neuns	3 ep	3 - 5	Moderate	Severe or Moderate	Slight	Severe	Moderate	30 - 50	High
184	IV EpG	Neuns	4 Ep	3 - 5	Severe	Severe or Moderate	Moderate	Severe	Moderate	30 - 55 55 - 75	High Very High

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
185	IV ExpG	Neuns	4 Ep	3 - 5	Severe	Severe or Moderate	Moderate	Severe	Moderate	50 - 100	Very High
		Lithic Xerumbrepts	4 Ep	7	Severe	Severe	Moderate	Severe	Severe	50 - 100	Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
186	III Epg	Neuns	3 Ep	3 - 5	Moderate	Severe or Moderate	Slight	Severe	Moderate	30 - 50	High
		Mieruf	3 Ep	3 - 4	Moderate	Moderate	Moderate	Severe	Slight	30 - 50	High
187	III Epg	Notned	3 Ep	3 - 4	Modsrate	Moderate	Moderate	Moderate	Slight	30 - 50	High
		Gerle	3 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Slight	30 - 50	High
188	III ep	Notned	3 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	5 - 20 20 - 30	Low Moderate
		Ledford	2 ep	2 - 3	Slight	Moderate	Slight	Moderate	Slight	5 - 20 20 - 30	Low Moderate
189	IV Epg	Notned	4 Ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Slight	30 - 50	High
		Ledford	3 ep	2 - 3	Moderate	Moderate	Slight	Moderate	Slight	30 - 50	High
190	III Expg	Notned	3 Ep	3 - 4	Moderate or Slight	Moderate	Moderate	Moderate	Slight	5 - 25 25 - 50	Moderate High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
191	III exP	Orthents	3 eP	3 - 5	Moderate or Slight	Not Rated	Slight	Moderate	Moderate	10 - 20 20 - 40	Moderate High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
192	II ep	Pilliken	2 ep	3	Slight	Moderate	Slight	Moderate	Slight	0 - 15 15 - 30	Low Moderate
193	III Epg	Pilliken	3 Ep	3	Moderate	Moderate	Moderate	Moderate	Slight	30 - 50	High
194	II exp	Pilliken	2 ep	3	Slight	Moderate	Slight	Moderate	Slight	5 - 15 15 - 30	Low Moderate
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
195	III Expg	Pilliken	3 eP	3	Moderate	Moderate				30 - 50	High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
196	Not Rated	Pits, borrow	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
197	Not Rated	Riverwash	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
198	Not Rated	Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not rated	
199	IV XG	Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
		Cryumbrepts	3 Ep	Not Rated	Severe to Slight	Not Rated	Moderate	Moderate	Slight	15 - 25 25 - 45 45 - 75	Moderate High Very High
200	IV XG	Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
		Tinker	4 Ep	4 - 5	Severe to Slight	Severe or Moderate	Moderate	Moderate	Moderate	15 - 20 20 - 45 45 - 75	Moderate High Very High
201	III eP	Tallac	3 ep	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Slight	2 - 20 20 - 30	Low Moderate
202	III eP	Tallac	3 eP	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Slight	15 - 20 20 - 30	Low Moderate
203	III eP	Tallac	3 eP	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Slight	15 - 20 20 - 30	Low Moderate
		Crybrepts, wet	3 eW	Not Rated	Severe	Not Rated	Slight	Moderate	Slight	15 - 25 25 - 30	Low Moderate

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptibility to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
204	III Expg	Tallac Variant	2 ep	5 - 6	Moderate or Slight	Moderate	Moderate	Moderate	Moderate	15 - 20 20 - 45 45 - 50	Moderate High Very High
		Lithic Xerumbrepts	4 EP	Not Rated	Moderate or Slight	Severe	Moderate	Severe	Moderate	15 - 40 40 - 50	High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
205	IV EPG	Tinker	4 Ep	4 - 5	Severe or Moderate	Severe or Moderate	Moderate	Moderate	Moderate	30 - 65 65 - 75	High Very High
206	III exP	Tinker	3 eP	4 - 5	Moderate	Severe or Moderate	Moderate	Moderate	Moderate	2 - 15 15 - 30	Low Moderate
		Cryumbrepts, wet	3 ew	Not Rated	Severe	Not Rated	Slight	Moderate	Slight	2 - 15 15 - 30	Low Moderate
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
207	IV EPG	Tinker	4 EP	4 - 5	Severe	Severe or Moderate	Moderate	Moderate	Moderate	50 - 65 65 - 75	High Very High
		Tallac	4 EP	3 - 4	Severe	Severe or Moderate	Moderate	Moderate	Moderate	50 - 70 70 - 75	High Very High
208	III exP	Tinker	3 eP	4 - 5	Moderate	Severe or Moderate	Moderate	Moderate	Moderate	5 - 15 15 - 30	Low Moderate
		Tallac	3 eP	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Slight	5 - 15 15 - 30	Low Moderate
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	
209	IV ExPG	Tinker	4 EP	4 - 5	Severe or Moderate	Severe or Moderate	Moderate	Moderate	Moderate	30 - 55 55 - 75	High Very High
		Tallac	4 eP	3 - 4	Severe or Moderate	Severe or Moderate	Moderate	Moderate	Moderate	30 - 60 60 - 75	High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	

TABLE 2 WOODLAND MANAGEMENT AND PRODUCTIVITY (CONT'D)

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
210	II ewp	Umbrepts	2 ew	Not Rated	Moderate	Not Rated	Slight	Severe	Slight	15 - 20 20 - 30	Low Moderate
		Tallac	3 eP	3 - 4	Moderate	Severe or Moderate	Moderate	Moderate	Slight	15 - 20 20 - 30	Low Moderate
		Gerle	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Slight	15 - 20 20 - 30	Low Moderate
211	II ep	Waca	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 15 15 - 30	Low Moderate
212	III epg	Waca	3 ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 50	High
213	III epg	Waca	3 ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 45 45 - 50	High Very High
		Lithic Cryumbrepts	4 EP	7	Moderate	Severe	Moderate	Severe	Severe	30 - 45 45 - 50	High Very High
214	II ep	Waca	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 10 10 - 30	Low Moderate
		Lithic Cryumbrepts	3 eP	7	Slight	Severe	Slight	Severe	Severe	5 - 10 10 - 30	Low Moderate
		Cryumbrepts, wet	3 eW	Not Rated	Severe	Not Rated	Slight	Moderate	Slight	5 - 10 10 - 30	Low Moderate
215	III epg	Waca	3 ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 45 45 - 50	High Very High
		Lithic Cryumbrepts	4 EP	7	Moderate	Severe	Moderate	Severe	Severe	30 - 45 45 - 50	High Very High
		Cryumbrepts, wet	3 W	Not Rated	Severe	Not Rated	Slight	Moderate	Moderate	30 - 50	High
216	II ep	Waca	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 15 15 - 30	Low Moderate
		Windy	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 15 15 - 30	Low Moderate

Map Symbol	Group	Soil Series	Class	Forest Survey Site Class	Equipment Limitations	Seedling Mortality (South Aspect)	Susceptability to Soil Damage from		Revegetating Exposed Subsoil	Erosion Hazard Rating	
							Fire	Displacement		% Slope	EHR
217	III epg	Waca	3 ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 50	High
		Windy	3 ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 50	High
218	II ep	Windy	2 ep	3 - 4	Slight	Moderate	Slight	Moderate	Moderate	5 - 20 20 - 30	Low Moderate
219	III epg	Windy	3 ep	3 - 4	Moderate	Moderate	Moderate	Moderate	Moderate	30 - 50	High
220	IV EPg	Xerumbrepts	4 EP	3 - 5	Moderate	Severe	Moderate	Moderate	Severe	5 - 30 30 - 50	Moderate High
		Cryumbrepts, wet	4 EW	Not Rated	Severe	Not Rated	Slight	Moderate	Moderate	5 - 30 30 - 50	Moderate High
221	III eP	Zeibright	3 eP	3 - 4	Slight	Severe	Moderate	Moderate	Moderate	2 - 20 20 - 30	Low Moderate
222	IV EPG	Zeibright	4 EP	3 - 4	Severe or Moderate	Severe	Moderate	Moderate	Severe	30 - 70 70 - 75	High Very High
223	III epg	Zeibright	3 ep	3 - 4	Moderate or Slight	Moderate	Moderate	Moderate	Moderate	15 - 20 20 - 50	Moderate High
224	IV ExPG	Zeibright	4 EP	3 - 4	Severe or Moderate	Severe	Moderate	Moderate	Severe	15 - 30 30 - 60 60 - 75	Moderate High Very High
		Rock Outcrop	Not Rated	Not Rated	Severe	Not Rated	Not Rated	Not Rated	Not Rated	Not Rated	

TABLE 3 - RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight, "moderate," and "severe." Absence of an entry indicates that the soil was not rated).

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
101*	Aiken	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
	Cohasset	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
102*	Andic cryumbrepts.				
	Lithic cryumbrepts.				
103*	Aquepts.				
	Umbrepts.				
104*	Bighill	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Musick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
105*	Bighill	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
	Rock outcrop.				
	Dome	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
106	Chaix	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
107*	Chaix	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
	Pilliken	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
108*	Chaix	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Pilliken	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
109*	Chaix	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Rock outcrop.				
110	Cohasset	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
111*	Cohasset	Severe: slope.	Severe: slope.	Severe: slope, small stones, dusty.	Moderate: slope, dusty.
	Hartless Variant	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: large stones, slope.
112*	Cohasset	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
113*	Cohasset	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
114*	Cohasset	Severe: slope.	Severe: slope.	Severe: slope, small stones, dusty.	Moderate: slope, dusty.
	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
115*	Cohasset	Severe: slope.	Severe: slope.	Severe: slope, small stones, dusty.	Severe: slope.
	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
116*	Crozier	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
	Cohasset	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
117*	Crozier	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Cohasset	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
118*	Crozier	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
119*	Crozier	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	McCarthy	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
120*	Cryumbrepts.				
121	Dome	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
122*	Dome	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
	Zeibright	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
123*	Dome	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
	Zeibright	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
124	Dome Variant	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Moderate: wetness.
125.	Fluvents				
126	Gerle	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
127*	Gerle	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
	Notned	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
128*	Gerle	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
	Tallac	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
129*	Gerle	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Tallac	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
130*	Gerle	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight
	Umbrepts.				
131*	Hangtown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
	Lithic xerumbrepts.				
132*	Hangtown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
	Smokey	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
133*	Hangtown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
	Smokey	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
134	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
135	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
136*	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
	Mieruf	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
137*, 138*	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
	Mieruf	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
139*	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
	Neuns	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
140*	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
	Neuns	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
141	Hartless Variant	Severe: slope, small stones.	Severe: slope, small stones,	Severe: slope, small stones.	Severe: slope.
142	Holland	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
143	Holland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
152*	Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
153*	Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Hartless	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
154*	Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
	Umbrepts.				
155*	Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
	Sites	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
156	Ledford	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
157*	Ledford	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
	Notned	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
158*	Ledford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Notned	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
159*	Ledmount	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: large stones, slope.
	Rock outcrop.				
160*	Ledmount	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
	Rock outcrop.				
161.	Lithic cryumbrepts				
162*	Lithic cryumbrepts.				
	Waca	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
163*	Lithic cryumbrepts.				
	Waca	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
164*	Lithic xerumbrepts.				
	Rock outcrop.				

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
165	Lumberly	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
166	Lumberly	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
167	Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.
168	Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
169*, 170*	Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.
	Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.
171*	Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.
	Maymen	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
172*	Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
	Maymen	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
173*, 174*	Maymen	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
	Rock outcrop.				
175, 176	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
177*	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
	Ledmount	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: large stones, slope.
178*	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
	Ledmount	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
179*	McCarthy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
	Rock outcrop.				

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
180	Mieruf	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
181	Mieruf	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
182	Neuns	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
183, 184	Neuns	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
185*	Neuns	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
	Lithic xerumbrepts.				
	Rock outcrop.				
186*	Neuns	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
	Mieruf	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
187*	Notned	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
	Gerle	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
188*	Notned	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
	Ledford	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
189*	Notned	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
	Ledford	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
190*	Notned	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
	Rock outcrop.				
191*	Ochrepts.				
	Rock outcrop.				
192	Pilliken	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
193	Pilliken	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
194*	Pilliken	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
	Rock.				
195*	Pilliken	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
	Rock outcrop.				
196*.	Pits				
0485*.	Riverwash				
198*.	Rock outcrop				
199*	Rock outcrop.				
	Cryumbrepts.				
200*	Rock outcrop.				
	Tinker	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
201, 202	Tallac	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.
203*	Tallac	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.
	Cryumbrepts.				
204*	Tallac Variant	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
	Lithic xerumbrepts.				
	Rock outcrop.				
205	Tinker	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
206*	Tinker	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones.
	Cryumbrept.				
	Rock outcrop.				
207*	Tinker	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
	Tallac	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
213*	Waca	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
	Lithic cryumbrepts.				
214*	Waca	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
	Lithic cryumbrepts.				
	Cryumbrepts.				
215*	Waca	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
	Lithic cryumbrepts.				
	Cryumbrepts.				
216*	Waca	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
	Windy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
217*	Waca	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
	Windy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.

TABLE 3 - RECREATIONAL DEVELOPMENT (CONT'D)

Map Symbol	Soil Name	Camp Areas	Picnic Areas	Playgrounds	Paths and Trails
218	Windy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
219	Windy	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
220*	Xerumbrepts.				
	Cryumbrepts.				
221	Zeibright	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones.
222	Zeibright	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope.
223	Zeibright	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
224*	Zeibright	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope.
	Rock outcrop.				
W*	Water				

TABLE 4 - CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good", "fair", and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
101	Aiken	Poor: low strength	Improbable: excess fines.	Improbable: excess fines.	Poor: Slope.
	Cohasset	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
102*	Andic cryumbrepts.				
	Lithic cryumbrepts.				
103*	Aquepts.				
	Umbrepts.				
104*	Bighill	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Musick	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
105*	Bighill	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Rock outcrop.				
	Dome	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
106	Chaix	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
107*	Chaix	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Pilliken	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
108*	Chaix	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Pilliken	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
109*	Chaix	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Rock outcrop.				
110	Cohasset	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
111*	Cohasset	Fair: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Hartless Variant	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
112*	Cohasset	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	McCarthy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
113*	Cohasset	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	McCarthy	Poor: area reclaim, slope.	Improbable: excessive fines.	Improbable: excess fines.	Poor: small stones, slope.
114*	Cohasset	Fair: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	McCarthy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
115*	Cohasset	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	McCarthy	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
116*	Crozier	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Cohasset	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
117*	Crozier	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Cohasset	Poor: slope.	Improbable: excess fines	Improbable: excess fines.	Poor: small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
118*	Crozier	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	McCarthy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
119*	Crozier	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	McCarthy.	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
120	Cryumbrepts.				
121	Dome	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
122*	Dome	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Zeibright	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
123*	Dome	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
	Zeibright	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
124	Dome Variant	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
125.	Fluvents				
126	Gerle	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
127*	Gerle	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Notned	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
128*	Gerle	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Tallac	Fair: cemented pan, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
129*	Gerle	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Tallac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
130*	Gerle	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Umbrepts.				

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
131*	Hangtown	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Lithic xerumbrepts.				
132*	Hangtown	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Smokey	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
133*	Hangtown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Smokey	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
134	Hartless	Fair: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
135	Hartless	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
136*	Hartless	Fair: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Mieruf	Fair: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
137*, 138*	Hartless	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Mieruf	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
139*	Hartless	Fair: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Neuns	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
140*	Hartless	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Neuns	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
141	Hartless Variant	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
142	Holland	Fair: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
143	Holland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
144*	Holland	Fair: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Bighill	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
145*	Holland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Bighill	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
146*	Holland	Fair: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Musick	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
147*	Holland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Musick	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
148*	Holland	Fair: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Pilliken	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
149*	Holland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Pilliken	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
150	Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
151	Jocal	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
152*	Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Hartless	Fair: depth to rock, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
153*	Jocal	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Hartless	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
154*	Jocal	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
	Umbrepts.				
155*	Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
	Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
156	Ledford	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
157*	Ledford	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Notned	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
158*	Ledford	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
	Notned	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
159*	Ledmount	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
	Rock outcrop.				
160*	Ledmount	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
	Rock outcrop.				
161.	Lithic cryumbrepts				
162*	Lithic cryumbrepts.				
	Waca	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
163*	Lithic cryumbrepts.				
	Waca	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
164	Lithic xerumbrepts.				
	Rock outcrop.				
165	Lumberly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
166	Lumberly	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
167	Mariposa	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
168	Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
169*, 170*	Mariposa	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
	Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
171*	Mariposa	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
	Maymen	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
172*	Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
	Maymen	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
173*, 174*	Maymen	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
	Rock outcrop.				
175, 176	McCarthy	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
177*	McCarthy	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Ledmount	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
178*	McCarthy	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Ledmount	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, large stones, slope.
179*	McCarthy	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
180	Mieruf	Fair: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
181	Mieruf	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
182	Neuns	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
183, 184	Neuns	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
185*	Neuns	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Lithic xerumbrepts.				
	Rock outcrop.				
186*	Neuns	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Mieruf	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
187*	Notned	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
	Gerle	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim. slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
188*	Notned	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
	Ledford	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
189*	Notned	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
	Ledford	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
190*	Notned	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
	Rock outcrop.				
191*	Ochrepts.				
	Rock outcrop				
192	Pilliken	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
193	Pilliken	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
194*	Pilliken	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Rock.				

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
195*	Pilliken	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Rock outcrop				
196*.	Pits				
0485*.	Riverwash				
198*.	Rock outcrop				
199*	Rock outcrop.				
	Cryumbrepts.				
200*	Rock outcrop				
	Tinker	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
201, 202	Tallac	Fair: cemented pan, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
203*	Tallac	Fair: cemented pan, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Cryumbrepts.				
204*	Tallac Variant	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Lithic xerumbrepts.				
	Rock outcrop.				
205	Tinker	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
206*	Tinker	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
	Cryumbrept.				
	Rock outcrop.				
207*	Tinker	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
	Tallac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
208*	Tinker	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
	Tallac	Fair: cemented pan, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Rock outcrop.				
209*	Tinker	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
	Tallac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Rock outcrop.				

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
210*	Umbrept.				
	Tallac	Fair: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Gerle	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
211	Waca	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
212	Waca	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
213*	Waca	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Lithic cryumbrepts.				
214*	Waca	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Lithic cryumbrepts.				
	Cryumbrepts.				
215*	Waca	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Lithic cryumbrepts.				
	Cryumbrepts.				

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
216*	Waca	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Windy	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
217*	Waca	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
	Windy	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
218	Windy	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
219	Windy	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
220*	Xerumbrepts.				
	Cryumbrepts.				
221	Zeibright	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
222	Zeibright	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.

TABLE 4 - CONSTRUCTION MATERIALS (CONT'D)

Map Symbol	Soil Name	Roadfill	Sand	Gravel	Topsoil
223	Zeibright	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
224*	Zeibright	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
	Rock outcrop.				
W*	Water				

TABLE 5 - ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Map Symbol	Soil Name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number -				Liquid Limit	Plasticity Index
		(In.)		Unified	AASHTO	(Pct.)	4	10	40	200	(Pct.)	
101*	Aiken	0 - 16	Loam	ML	A-4, A-5	0 - 5	95 - 100	80 - 100	65 - 75	50 - 60	25 - 45	NP - 10
		16 - 36	Clay loam	ML	A-6, A-7	0 - 10	95 - 100	90 - 100	75 - 95	65 - 80	35 - 50	10 - 20
		36 - 80	Clay	ML, MH	A-7	0 - 10	95 - 100	95 - 100	90 - 95	75 - 85	45 - 60	15 - 25
	Cohasset	0 - 19	Loam	ML	A-4	0 - 5	90 - 100	80 - 95	65 - 80	50 - 65	20 - 40	NP - 10
		19 - 44	Clay loam, gravelly clay loam, gravelly loam.	ML, SM	A-4, A-6, A-7	0 - 5	70 - 95	60 - 85	50 - 80	40 - 60	30 - 45	5 - 15
		44	Weathered Bedrock	-	-	-	-	-	-	-	-	-
102*	Andic cryumbrepts.											
	Lithic cryumbrepts.											
103*	Aquepts.											
	Umbrepts.											
104*	Bighill	0 - 5	Coarse sandy loam.	SM	A-2, A-4	0	80 - 100	75 - 95	50 - 75	25 - 40	20 - 30	NP - 5
		5 - 17	Gravelly sandy loam, gravelly coarse sandy loam.	GM, SM	A-1, A-2	0 - 5	60 - 80	55 - 75	30 - 45	15 - 30	20 - 30	NP - 5
		17 - 32	Cobbly sandy loam, cobbly coarse sandy loam.	GM, SM	A-1, A-2	20 - 35	65 - 85	60 - 80	35 - 50	20 - 30	20 - 30	NP - 5
		32	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Musick	0 - 6	Loam	ML	A - 4	0	100	95 - 100	80 - 90	50 - 60	30 - 40	NP - 10
		6 - 43	Sandy clay loam, clay loam.	SM, ML	A - 7	0	100	95 - 100	80 - 90	40 - 60	40 - 50	10 - 20
		43 - 68	Sandy clay loam, sandy loam.	SM	A - 6, A - 7	0	100	95 - 100	70 - 85	35 - 50	35 - 45	10 - 15
		68 - 71	Sandy loam, coarse sandy Loam, Loam.	SM	A - 2, A - 4	0	95 - 100	95 - 100	60 - 80	30 - 50	20 - 30	NP - 5

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
105*	Bighill	0 - 5	Coarse sandy loam.	SM	A-2, A-4	0	80 - 100	75 - 95	50 - 75	25 - 40	20 - 30	NP - 5
		5 - 17	Gravelly sandy loam, gravelly coarse sandy loam.	GM, SM	A-1, A-2	0 - 5	60 - 80	55 - 75	30 - 45	15 - 30	20 - 30	NP - 5
		17 - 32	Cobbly sandy loam, cobbly coarse sandy loam.	GM, SM	A-1, A-2	20 - 35	65 - 85	60 - 80	35 - 50	20 - 30	20 - 30	NP - 5
		32	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Rock outcrop.											
	Dome	0 - 7	Gravelly coarse sandy loam.	SM	A-1, A-2	0 - 5	80 - 95	60 - 75	35 - 50	20 - 35	20 - 25	NP - 5
		7 - 60	Gravelly sandy loam, gravelly coarse sandy loam.	SM	A-1, A-2	0 - 5	80 - 95	60 - 75	35 - 50	20 - 35	20 - 25	NP - 5
106	Chaix	0 - 5	Coarse sandy loam.	SM	A-1, A-2	0 - 5	90 - 100	75 - 95	45 - 65	20 - 35	-	NP
		5 - 30	Coarse sandy loam, sandy loam.	SM	A-1, A-2	0 - 5	90 - 100	75 - 95	45 - 65	20 - 35	-	NP
		30	Weathered bedrock	-	-	-	-	-	-	-	-	-
107*, 108*	Chaix	0 - 5	Coarse sandy loam.	SM	A-1, A-2	0 - 5	90 - 100	75 - 95	45 - 65	20 - 35	-	NP
		5 - 30	Coarse sandy loam, sandy loam.	SM	A-1, A-2	0 - 5	90 - 100	75 - 95	45 - 65	20 - 35	-	NP
		30	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Pilliken	0 - 25	Coarse sandy loam.	SM	A-2, A-4	0	85 - 100	75 - 95	50 - 65	20 - 40	20 - 30	NP - 5
		25 - 58	Gravelly coarse sandy loam, gravelly loamy coarse sand.	SM	A-1, A-2	0	70 - 85	60 - 75	35 - 50	15 - 35	20 - 30	NP - 5
		58	Weathered bedrock	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
109*	Chaix	0 - 5	Coarse sandy loam.	SM	A-1, A-2	0 - 5	90 - 100	75 - 95	45 - 65	20 - 35	-	NP
		5 - 30	Coarse sandy loam, sandy loam.	SM	A-1, A-2	0 - 5	90 - 100	75 - 95	45 - 65	20 - 35	-	NP
		30	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Rock outcrop.											
110	Cohasset	0 - 19	Loam	ML	A-4	0 - 5	90 - 100	80 - 95	65 - 80	50 - 65	20 - 40	NP - 10
		19 - 44	Clay loam, gravelly clay loam, gravelly loam.	ML, SM	A-4, A-6, A-7	0 - 5	70 - 95	60 - 85	50 - 80	40 - 60	30 - 45	5 - 15
		44	Weathered bedrock	-	-	-	-	-	-	-	-	-
111*	Cohasset	0 - 7	Gravelly loam.	SM, GM	A-2, A-4	0 - 5	60 - 85	50 - 75	40 - 65	30 - 50	20 - 40	NP - 10
		7 - 56	Clay loam, gravelly clay loam, gravelly loam.	SM, ML, GM	A-4, A-6, A-7	0 - 5	60 - 90	50 - 85	45 - 75	40 - 60	30 - 45	5 - 15
		56 - 61	Cobbly clay loam, cobbly loam.	ML, SM	A-4, A-6, A-7	15 - 30	70 - 90	65 - 80	50 - 75	40 - 60	30 - 45	5 - 15
		61	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Hartless Variant	0 - 12	Very gravelly sandy loam.	GM	A-1, A-2	10 - 30	40 - 60	35 - 55	25 - 50	20 - 35	-	NP
		12 - 21	Gravelly sandy loam, very gravelly sandy loam.	GM	A-1, A-2	5 - 25	40 - 60	35 - 55	25 - 50	20 - 35	20 - 25	NP - 5
		21 - 41	Very cobbly sandy loam.	GM, SM	A-2	40 - 55	55 - 75	50 - 70	40 - 55	25 - 35	20 - 25	NP - 5
		41 - 60	Loamy coarse sand	SM	A-1, A-2	0	95 - 100	85 - 100	40 - 60	10 - 25	-	NP
112*, 113*	Cohasset	0 - 19	Loam	ML	A-4	0 - 5	90 - 100	80 - 95	65 - 80	50 - 65	20 - 40	NP - 10
		19 - 44	Clay loam, gravelly, clay loam, gravelly loam.	ML, SM	A-4, A-6, A-7	0 - 5	70 - 95	60 - 85	50 - 80	40 - 60	30 - 45	5 - 15
		44	Weathered bedrock	-	-	-	-	-	-	-	-	-

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
112*, 113*	McCarthy	0 - 22	Gravelly sandy loam.	GM, SM	A-2, A-4	5 - 15	55 - 80	50 - 75	35 - 55	30 - 45	25 - 35	NP - 5
		22 - 26	Very gravelly sandy loam, very gravelly loam, cobbly sandy loam.	GM	A-2, A-4, A-1	10 - 50	30 - 60	30 - 60	20 - 50	10 - 40	25 - 35	NP - 5
		26	Weathered bedrock	-	-	-	-	-	-	-	-	-
114*, 115*	Cohasset	0 - 5	Gravelly sandy loam.	SM, GM	A-2, A-4	0 - 5	60 - 85	50 - 75	40 - 65	30 - 50	20 - 40	NP - 10
		5 - 57	Clay loam, gravelly clay loam, gravelly loam.	SM, ML, GM	A-4, A-6, A-7	0 - 5	60 - 90	50 - 85	45 - 75	40 - 60	30 - 45	5 - 15
		57	Weathered bedrock	-	-	-	-	-	-	-	-	-
	McCarthy	0 - 24	Gravelly loam.	GM, SM	A-2, A-4	5 - 15	55 - 80	50 - 75	35 - 55	30 - 45	25 - 35	NP-5
		24	Weathered bedrock	-	-	-	-	-	-	-	-	
116*, 117*	Crozier	0 - 16	Loam	ML	A-4	0 - 5	80 - 100	75 - 95	65 - 90	50 - 60	25 - 35	NP - 10
		16 - 34	Gravelly loam, gravelly clay loam.	CL-ML, ML, GM-GC, GM	A-4, A-6, A-7	5 - 15	60 - 80	55 - 75	50 - 70	40 - 60	25 - 45	5 - 15
		34	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Cohasset	0 - 19	Loam	ML	A-4	0 - 5	90 - 100	80 - 95	65 - 80	50 - 65	20 - 40	NP-10
		19 - 44	Clay loam, gravelly clay loam, gravelly loam.	ML, SM	A-4, A-6, A-7	0 - 5	70 - 95	60 - 85	50 - 80	40 - 60	30 - 45	5 - 15
		44	Weathered bedrock	-	-	-	-	-	-	-	-	-
118*, 119*	Crozier	0 - 16	Loam	ML	A-4	0 - 5	80 - 100	75 - 95	65 - 90	50 - 60	25 - 35	NP - 10
		16 - 34	Gravelly loam, gravelly clay loam.	CL-ML, ML, GM-GC, GM	A-4, A-6, A-7	5 - 15	60 - 80	55 - 75	50 - 70	40 - 60	25 - 45	5 - 15
		34	Unweathered bedrock.	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number -				Liquid Limit	Plasticity Index
		(In.)		Unified	AASHTO	(Pct.)	4	10	40	200	(Pct.)	
118*, 119*	McCarthy	0 - 22	Gravelly sandy loam.	GM, SM	A-2, A-4	5 - 15	55 - 80	50 - 75	35 - 55	30 - 45	25 - 35	NP - 5
		22 - 26	Very gravelly sandy loam, very gravelly loam, cobbly sandy loam.	GM	A-2, A-4, A-1	10 - 50	30 - 60	30 - 60	20 - 50	10 - 40	25 - 35	NP - 5
		26	Weathered bedrock	-	-	-	-	-	-	-	-	-
120*	Cryumbrepts.											
121	Dome	0 - 7	Gravelly coarse sandy loam.	SM	A - 1, A-2	0 - 5	80 - 95	60 - 75	35 - 50	20 - 35	20 - 25	NP - 5
		7 - 60	Gravelly sandy loam, gravelly coarse sandy loam.	SM	A-1, A-2	0 - 5	80 - 95	60 - 75	35 - 50	20 - 35	20 - 25	NP - 5
122*, 123	Dome	0 - 7	Gravelly coarse sandy loam.	SM	A-1, A-2	0 - 5	80 - 95	60 - 75	35 - 50	20 - 35	20 - 25	NP - 5
		7 - 60	Gravelly sandy loam, gravelly coarse sandy loam.	SM	A-1, A-2	0 - 5	80 - 95	60 - 75	35 - 50	20 - 35	20 - 25	NP - 5
	Zeibright	0 - 10	Gravelly sandy loam.	SM, GM	A-2, A-4	15 - 20	65 - 75	60 - 70	40 - 60	25 - 45	20 - 30	NP - 5
		10 - 61	Very cobbly fine sandy loam, very cobbly sandy loam, extremely cobbly sandy loam.	SM, GM	A-1, A-2	40 - 65	50 - 70	45 - 65	35 - 60	20 - 35	20 - 30	NP - 5
124	Dome Variant	0 - 22	Coarse sandy loam.	SM	A-2, A-4	0 - 5	90 - 100	85 - 100	55 - 70	25 - 40	20 - 30	NP - 5
		22 - 55	Coarse sandy loam, sandy loam.	SM	A-2, A-4	0 - 5	90 - 100	85 - 100	55 - 70	25 - 40	20 - 30	NP - 5
		55 - 60	Loamy coarse sand, loamy sand.	SM	A-1, A-2	0 - 5	90 - 100	85 - 100	40 - 60	15 - 25	-	NP
125.	Fluvents											

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
126	Gerle	0 - 12	Coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		12 - 41	Sandy loam, coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		41 - 62	Cobbly sandy loam, gravelly sandy loam.	SM	A-2	0 - 40	70 - 95	60 - 90	40 - 60	25 - 35	20 - 30	NP - 5
127*	Gerle	0 - 12	Coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		12 - 41	Sandy loam, coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		41 - 62	Cobbly sandy loam, gravelly sandy loam.	SM	A-2	0 - 40	70 - 95	60 - 90	40 - 60	25 - 35	20 - 30	NP - 5
	Notned	0 - 16	Bouldery coarse sandy loam.	SM	A - 1, A-2	15 - 25	70 - 95	65 - 90	30 - 50	20 - 35	-	NP
		16 - 62	Very cobbly coarse sandy loam, very cobbly sandy loam.	SM, GM	A-1, A-2	35 - 55	55 - 75	50 - 70	25 - 40	20 - 30	-	NP
128*, 129*	Gerle	0 - 12	Coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		12 - 41	Sandy loam, coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		41 - 62	Cobbly sandy loam, gravelly sandy loam.	SM	A-2	0 - 40	70 - 95	60 - 90	40 - 60	25 - 35	20 - 30	NP - 5
	Tallac	0 - 29	Very cobbly sandy loam.	GM, SM	A-1, A-2	30 - 55	50 - 70	45 - 65	15 - 35	10 - 35	-	NP
		29 - 61	Very gravelly coarse sandy loam, very gravelly loam.	GM	A-1, A-2	5 - 20	35 - 55	30 - 50	15 - 30	10 - 30	-	NP
130*	Gerle	0 - 12	Coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		12 - 41	Sandy loam, coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		41 - 62	Cobbly sandy loam, gravelly sandy loam.	SM	A-2	0 - 40	70 - 95	60 - 90	40 - 60	25 - 35	20 - 30	NP - 5
	Umbrepts.											

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number -				Liquid Limit	Plasticity Index
		(In.)		Unified	AASHTO	(Pct.)	4	10	40	200	(Pct.)	
131*	Hangtown	0 - 3	Gravelly fine sandy loam.	SM	A-2, A-4	5 - 25	70 - 85	65 - 80	40 - 65	25 - 40	-	NP
		3 - 24	Very gravelly fine sandy loam, very gravelly sandy loam.	GM, SM	A-1	25 - 45	45 - 70	40 - 65	30 - 50	15 - 25	20 - 30	NP - 5
		24 - 46	Very cobbly fine sandy loam, very stony sandy loam.	GM, SM	A-1	40 - 50	50 - 75	45 - 70	30 - 50	15 - 25	20 - 30	NP - 5
		46	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Lithic xerumbrepts.											
132*, 133*	Hangtown	0 - 3	Gravelly fine sandy loam.	SM	A - 2, A-4	5 - 25	70 - 85	65 - 80	40 - 65	25 - 40	-	NP
		3 - 24	Very gravelly fine sandy loam, very gravelly sandy loam.	GM, SM	A-1	25 - 45	45 - 70	40 - 65	30 - 50	15 - 25	20 - 30	NP - 5
		24 - 46	Very cobbly fine sandy loam, very stony sandy loam.	GM, SM	A-1	40 - 50	50 - 75	45 - 70	30 - 50	15 - 25	20 - 30	NP - 5
		46	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Smokey	0 - 3	Gravelly loam.	GM, SM	A-4	5 - 15	60 - 85	55 - 80	45 - 75	35 - 50	25 - 35	NP - 10
		3 - 16	Very gravelly loam, very gravelly silt loam.	GM-GC, GM	A-2	5 - 20	35 - 60	30 - 50	25 - 45	20 - 35	25 - 35	5 - 10
		16 - 38	Very gravelly silt loam, very gravelly sandy loam, very gravelly loam.	GM-GC, GM	A-2	5 - 20	25 - 55	20 - 45	15 - 40	10 - 30	25 - 35	5 - 10
		38	Weathered bedrock	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
134, 135	Hartless	0 - 7	Very gravelly loam.	GM, GM-GC	A-1, A-2	0 - 15	40 - 45	35 - 40	25 - 35	15 - 30	20 - 30	NP - 5
		7 - 58	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam.	GM, GM-GC	A-1, A-2	10 - 35	40 - 45	35 - 40	25 - 35	10 - 30	20 - 30	NP - 10
		58 - 64	Extremely gravelly sandy loam, extremely cobbly sandy loam.	GM, GM-GC	A-1, A-2	25 - 35	35 - 45	30 - 40	20 - 35	10 - 20	20 - 30	NP - 10
		64	Weathered bedrock	-	-	-	-	-	-	-	-	-
136*, 137*, 138*	Hartless	0 - 7	Very gravelly loam.	GM, GM-GC	A-1, A-2	0 - 15	40 - 45	35 - 40	25 - 35	15 - 30	20 - 30	NP - 5
		7 - 58	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam.	GM, GM-GC	A-1, A-2	10 - 35	40 - 45	35 - 40	25 - 35	10 - 30	20 - 30	NP - 10
		58 - 64	Extremely gravelly sandy loam, extremely cobbly sandy loam.	GM, GM-GC	A-1, A-2	25 - 35	35 - 45	30 - 40	20 - 35	10 - 20	20 - 30	NP - 10
		64	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Mieruf	0 - 6	Very gravelly loam.	GM	A-2	0	50 - 55	45 - 50	30 - 45	20 - 40	25 - 35	NP - 10
		6 - 25	Gravelly loam, gravelly silt loam, gravelly fine sandy loam.	GM, GM-GC, SM, SM-SC	A-4	0	55 - 80	50 - 75	45 - 65	35 - 50	25 - 35	5 - 10
		25 - 50	Loam, silt loam, fine sandy loam.	SM, SM-SC, ML, CL-ML	A-4	0	80 - 100	75 - 100	65 - 90	45 - 60	25 - 35	5 - 10
		50	Weathered bedrock	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
139*, 140*	Hartless	0 - 7	Very gravelly loam.	GM, GM-GC	A-1, A-2	0 - 15	40 - 45	35 - 40	25 - 35	15 - 30	20 - 30	NP - 5
		7 - 58	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam.	GM, GM-GC	A-1, A-2	10 - 35	40 - 45	35 - 40	25 - 35	10 - 30	20 - 30	NP - 10
		58 - 64	Extremely gravelly sandy loam, extremely cobbly sandy loam.	GM, GM-GC	A-1, A-2	25 - 35	35 - 45	30 - 40	20 - 35	10 - 20	20 - 30	NP - 10
		64	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Neuns	0 - 3	Gravelly loam.	SM, GM	A-4	0 - 5	55 - 80	50 - 75	40 - 60	35 - 50	15 - 25	NP - 5
		3 - 34	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0 - 10	30 - 55	25 - 50	20 - 45	10 - 35	15 - 25	NP - 5
		34	Unweathered bedrock	-	-	-	-	-	-	-	-	-
141	Hartless Variant	0 - 12	Very gravelly sandy loam.	GM	A-1, A-2	10 - 30	40 - 60	35 - 55	25 - 50	20 - 35	- 20 - 25	NP NP - 5
		12 - 21	Gravelly sandy loam, very gravelly sandy loam.	GM	A-1, A-2	5 - 25	40 - 60	35 - 55	25 - 50	20 - 35		
		21 - 41	Very cobbly sandy loam.	GM, SM	A-2	40 - 55	55 - 75	50 - 70	40 - 55	25 - 35	20 - 25	NP - 5
		41 - 60	Loamy coarse sand	SM	A-1, A-2	0	95 - 100	85 - 100	40 - 60	10 - 25	-	NP
142, 143	Holland	0 - 8	Loam	ML	A-4	0	90 - 100	85 - 100	65 - 85	50 - 60	20 - 35	NP - 10
		8 - 56	Sandy clay loam, clay loam.	SC, CL	A-6	0	90 - 100	85 - 100	70 - 90	40 - 70	25 - 40	10 - 20
		56 - 64	Sandy loam, loam	SM, ML, SM-SC, CL-ML	A-4	0	90 - 100	85 - 100	60 - 85	35 - 60	20 - 30	NP - 10
144*, 145*	Holland	0 - 8	Loam	ML	A-4	0	90 - 100	85 - 100	65 - 85	50 - 60	20 - 35	NP - 10
		8 - 56	Sandy clay loam, clay loam.	SC, CL	A-6	0	90 - 100	85 - 100	70 - 90	40 - 70	25 - 40	10 - 20
		56 - 64	Sandy loam, loam	SM, ML, SM-SC, CL-ML	A-4	0	90 - 100	85 - 100	60 - 85	35 - 60	20 - 30	NP - 10

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
144*, 145*	Bighill	0 - 5	Coarse sandy loam.	SM	A-2, A-4	0	80 - 100	75 - 95	50 - 75	25 - 40	20 - 30	NP - 5
		5 - 17	Gravelly sandy loam, gravelly coarse sandy loam.	GM, SM	A-1, A-2	0 - 5	60 - 80	55 - 75	30 - 45	15 - 30	20 - 30	NP - 5
		17 - 32	Cobbly sandy loam, cobbly coarse sandy loam.	GM, SM	A-1, A-2	20 - 35	65 - 85	60 - 80	35 - 50	20 - 30	20 - 30	NP - 5
		32	Weathered bedrock	-	-	-	-	-	-	-	-	-
146*, 147*	Holland	0 - 8	Loam	ML	A-4	0	90 - 100	85 - 100	65 - 85	50 - 60	20 - 35	NP - 10
		8 - 56	Sandy clay loam, clay loam.	SC, CL	A-6	0	90 - 100	85 - 100	70 - 90	40 - 70	25 - 40	10 - 20
		56 - 64	Sandy loam, loam.	SM, ML, SM-SC, CL-ML	A-4	0	90 - 100	85 - 100	60 - 85	35 - 60	20 - 30	NP - 10
	Musick	0 - 6	Loam	ML	A-4	0	100	95 - 100	80 - 90	50 - 60	30 - 40	NP - 10
		6 - 43	Sandy clay loam. clay loam.	SM, ML	A-7	0	100	95 - 100	80 - 90	40 - 60	40 - 50	10 - 20
		43 - 68	Sandy clay loam, sandy loam.	SM	A-6, A-7	0	100	95 - 100	70 - 85	35 - 50	35 - 45	10 - 15
		68 - 71	Sandy loam, coarse sandy loam, loam.	SM	A-2, A-4	0	95 - 100	95 - 100	60 - 80	30 - 50	20 - 30	NP - 5
148*, 149*	Holland	0 - 8	Loam	ML	A-4	0	90 - 100	85 - 100	65 - 85	50 - 60	20 - 35	NP - 10
		8 - 56	Sandy clay loam, clay loam.	SC, CL	A-6	0	90 - 100	85 - 100	70 - 90	40 - 70	25 - 40	10 - 20
		56 - 64	Sandy loam, loam	SM, ML, SM-SC, CL-ML	A-4	0	90 - 100	85 - 100	60 - 85	35 - 60	20 - 30	NP - 10
	Pilliken	0 - 25	Coarse sandy loam.	SM	A-2, A-4	0	85 - 100	75 - 95	50 - 65	20 - 40	20 - 30	NP - 5
		25 - 58	Gravelly coarse sandy loam, gravelly loamy coarse sand.	SM	A-1, A-2	0	70 - 85	60 - 75	35 - 50	15 - 35	20 - 30	NP - 5
		58	Weathered bedrock	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number -				Liquid Limit	Plasticity Index
		(In.)		Unified	AASHTO	(Pct.)	4	10	40	200	(Pct.)	
150, 151	Jocal	0 - 15	Loam	ML	A-4	0	80 - 95	75 - 95	65 - 80	55 - 70	25 - 35	NP - 10
		15 - 45	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80 - 95	75 - 95	70 - 90	60 - 85	35 - 50	10 - 25
		45 - 70	Sandy clay loam	SC	A-6	0	80 - 95	75 - 90	65 - 80	35 - 50	30 - 40	10 - 20
		70	Weathered bedrock	-	-	-	-	-	-	-	-	-
152*, 153*	Jocal	0 - 15	Loam	ML	A-4	0	80 - 95	75 - 95	65 - 80	55 - 70	25 - 35	NP - 10
		15 - 45	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80 - 95	75 - 95	70 - 90	60 - 85	35 - 50	10 - 25
		45 - 70	Sandy clay loam.	SC	A-6	0	80 - 95	75 - 90	65 - 80	35 - 50	30 - 40	10 - 20
		70	Weathered bedrock	-			-	-	-	-	-	-
	Hartless	0 - 11	Very gravelly loam.	GM, GM-GC	A-1, A-2	0 - 15	40 - 45	35 - 40	25 - 35	15 - 30	20 - 30	NP - 5
		11 - 47	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam.	GM, GM-GC	A-1, A-2	10 - 35	40 - 45	35 - 40	25 - 35	10 - 30	20 - 30	NP - 10
		47	Weathered bedrock	-	-	-	-	-	-	-	-	-
154*	Jocal	0 - 15	Loam	ML	A-4	0	80 - 95	75 - 95	65 - 80	55 - 70	25 - 35	NP - 10
		15 - 45	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80 - 95	75 - 95	70 - 90	60 - 85	35 - 50	10 - 25
		45 - 70	Sandy clay loam.	SC	A-6	0	80 - 95	75 - 90	65 - 80	35 - 50	30 - 40	10 - 20
		70	Weathered bedrock	-	-		-	-	-	-	-	-
	Mariposa	0 - 5	Gravelly silt loam.	SM, GM	A-2, A-4	0 - 5	65 - 85	60 - 75	40 - 60	30 - 45	25 - 40	NP - 10
		5 - 30	Gravelly loam, gravelly silt loam, gravelly clay loam.	SM-SC, SC, GC, GM-GC	A-2, A-4, A-6	0 - 5	65 - 85	55 - 75	40 - 60	30 - 45	25 - 40	5 - 15
		30	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Umbrepts.											
155*	Jocal	0 - 15	Loam	ML	A-4	0	80 - 95	75 - 95	65 - 80	55 - 70	25 - 35	NP - 10
		15 - 45	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80 - 95	75 - 95	70 - 90	60 - 85	35 - 50	10 - 25
		45 - 70	Sandy clay loam.	SC	A-6	0	80 - 95	75 - 90	65 - 80	35 - 50	30 - 40	10 - 20
		70	Weathered bedrock	-	-		-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification		Fragments > 3 inches (Pct.)	Percentage passing sieve number -				Liquid Limit (Pct.)	Plasticity Index
				Unified	AASHTO		4	10	40	200		
155*	Sites	0 - 3	Loam	ML	A-4	0 - 5	90 - 100	80 - 95	60 - 75	50 - 65	20 - 40	NP - 10
		3 - 61	Clay, clay loam.	MH, ML	A-7	0	90 - 100	85 - 95	75 - 90	70 - 85	45 - 60	15 - 25
		61	Weathered bedrock	-	-	-	-	-	-	-	-	-
156	Ledford	0 - 12	Sandy loam.	SM	A-2	0	85 - 100	75 - 95	45 - 60	25 - 35	-	NP
		12 - 37	Gravelly sandy loam, gravelly coarse sandy loam.	SM	A-1, A-2	0	85 - 90	50 - 75	30 - 50	20 - 30	20 - 30	NP - 5
		37 - 47	Gravelly sandy loam, very gravelly sandy loam, gravelly coarse sandy loam.	SM, GM	A-1, A-2	0	45 - 85	35 - 70	25 - 50	15 - 30	20 - 30	NP - 5
		47	Weathered bedrock	-	-	-	-	-	-	-	-	-
157*, 158*	Ledford	0 - 12	Sandy loam.	SM	A-2	0	85 - 100	75 - 95	45 - 60	25 - 35	-	NP
		12 - 37	Gravelly sandy loam, gravelly coarse sandy loam.	SM	A-1, A-2	0	85 - 90	50 - 75	30 - 50	20 - 30	20 - 30	NP - 5
		37 - 47	Gravelly sandy loam, very gravelly sandy loam, gravelly coarse sandy loam.	SM, GM	A-1, A-2	0	45 - 85	35 - 70	25 - 50	15 - 30	20 - 30	NP - 5
		47	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Notned	0 - 16	Bouldery coarse sandy loam.	SM	A-1, A-2	15 - 25	70 - 95	65 - 90	30 - 50	20 - 35	-	NP
		16 - 62	Very cobbly coarse sandy loam, very cobbly sandy loam.	SM, GM	A-1, A-2	35 - 55	55 - 75	50 - 70	25 - 40	20 - 30	-	NP
159*, 160*	Ledmount	0 - 6	Cobbly sandy loam.	SM	A-4	15 - 40	75 - 95	70 - 90	50 - 75	35 - 50	20 - 35	NP - 10
		6 - 15	Gravelly sandy loam, cobbly sandy loam.	SM, GM	A-2, A-4	10 - 40	70 - 95	65 - 90	50 - 75	30 - 50	20 - 35	NP - 10
		15	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Rock outcrop.											
161	Lithic cryumbrepts											

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification		Fragments > 3 inches (Pct.)	Percentage passing sieve number -				Liquid Limit (Pct.)	Plasticity Index
				Unified	AASHTO		4	10	40	200		
162*, 163*	Lithic Cryumbrepts.											
	Waca	0 - 9	Cobbly sandy loam.	GM, SM	A-1, A-2	10 - 20	55 - 80	50 - 75	35 - 50	20 - 30	-	NP
		9 - 27	Very cobbly coarse sandy loam, very cobbly sandy loam, very cobbly loam.	GM	A-1	20 - 30	35 - 60	30 - 50	20 - 35	10 - 25	-	NP
		27	Weathered bedrock	-	-	-	-	-	-	-	-	-
164*	Lithic xerumbrepts.											
	Rock outcrop.											
165, 166	Lumberly	0 - 10	Gravelly coarse sandy loam.	SM	A-1, A-2	0 - 5	80 - 95	50 - 75	30 - 50	15 - 30	-	NP
		10 - 33	Gravelly coarse sandy loam.	SM	A-1, A-2	0 - 5	80 - 95	50 - 75	30 - 50	15 - 30	-	NP
		33	Weathered bedrock	-	-	-	-	-	-	-	-	-
167, 168	Mariposa	0 - 5	Gravelly silt loam.	SM, GM	A-2, A-4	0 - 5	65 - 85	60 - 75	40 - 60	30 - 45	25 - 40	NP - 10
		5 - 30	Gravelly loam, gravelly silt loam, gravelly clay loam.	SM-SC, SC, GC, GM-GC	A-2, A-4, A-6	0 - 5	65 - 85	55 - 75	40 - 60	30 - 45	25 - 40	NP - 15
		30	Unweathered bedrock	-	-	-	-	-	-	-	-	-
169*, 170*	Mariposa	0 - 5	Gravelly silt loam.	SM, GM	A-2, A-4	0 - 5	65 - 85	60 - 75	40 - 60	30 - 45	25 - 40	NP - 10
		5 - 30	Gravelly loam, gravelly silt loam, gravelly clay loam.	SM-SC, SC, GC, GM-GC	A-2, A-4, A-6	0 - 5	65 - 85	55 - 75	40 - 60	30 - 45	25 - 40	5 - 15
		30	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Jocal	0 - 15	Loam	ML	A-4	0	80 - 95	75 - 95	65 - 80	55 - 70	25 - 35	NP - 10
		15 - 45	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80 - 95	75 - 95	70 - 90	60 - 85	35 - 50	10 - 25
		45 - 70	Sandy clay loam.	SC	A-6	0	80 - 95	75 - 90	65 - 80	35 - 50	30 - 40	10 - 20
		70	Weathered bedrock	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
171*, 172*	Mariposa	0 - 5	Gravelly silt loam.	SM, GM	A-2, A-4	0 - 5	65 - 85	60 - 75	40 - 60	30 - 45	25 - 40	NP - 10
		5 - 30	Gravelly loam, gravelly silt loam, gravelly clay loam.	SM-SC, SC, GC, GM-GC	A-2, A-4, A-6	0 - 5	65 - 85	55 - 75	40 - 60	30 - 45	25 - 40	NP - 15
		30	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Maymen	0 - 13	Gravelly loam.	SM, GM	A-2, A-4	0 - 5	60 - 80	50 - 75	30 - 60	25 - 50	20 - 35	NP - 10
		13	Unweathered bedrock	-	-	-	-	-	-	-	-	-
173*, 174*	Maymen	0 - 13	Gravelly loam	SM, GM	A-2, A-4	0 - 5	60 - 80	50 - 75	30 - 60	25 - 50	20 - 35	NP - 10
		13	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Rock outcrop.											
175, 176	McCarthy	0 - 22	Gravelly sandy loam.	GM, SM	A-2, A-4	5 - 15	55 - 80	50 - 75	35 - 55	30 - 45	25 - 35	NP -5
		22 - 26	Very gravelly sandy loam, very gravelly loam, cobbly sandy loam.	GM	A-2, A-4, A-1	10 - 50	30 - 60	30 - 60	20 - 50	10 - 40	25 - 35	NP - 5
		26	Weathered bedrock	-	-	-	-	-	-	-	-	-
177*, 178*	McCarthy	0 - 22	Gravelly sandy loam.	GM, SM	A-2, A-4	5 - 15	55 - 80	50 - 75	35 - 55	30 - 45	25 - 35	NP - 5
		22 - 26	Very gravelly sandy loam, very gravelly loam, cobbly sandy loam.	GM	A-2, A-4, A-1	10 - 50	30 - 60	30 - 60	20 - 50	10 - 40	25 - 35	NP - 5
		26	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Ledmount	0 - 6	Cobbly sandy loam.	SM	A-4	15 - 40	75 - 95	70 - 90	50 - 75	35 - 50	20 - 35	NP - 10
		6 - 15	Gravelly sandy loam, cobbly sandy loam.	SM, GM	A-2, A-4	10 - 40	70 - 95	65 - 90	50 - 75	30 - 50	20 - 35	NP - 10
		15	Unweathered bedrock	-	-	-	-	-	-	-	-	-
179*	McCarthy	0 - 24	Gravelly loam.	GM, SM	A-2, A-4	5 - 15	55 - 80	50 - 75	35 - 55	30 - 45	25 - 35	NP - 5
		24	Weathered bedrock	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
180, 181	Mieruf	0 - 6	Very gravelly loam.	GM	A-2	0	50 - 55	45 - 50	30 - 45	20 - 40	25 - 35	NP - 10
		6 - 25	Gravelly loam, gravelly silt loam, gravelly fine sandy loam.	GM,GM-GC, SM, SM-SC	A-4	0	55 - 80	50 - 75	45 - 65	35 - 50	25 - 35	5 - 10
		25 - 50	Loam, silt loam, fine sandy loam.	SM, SM-SC, ML, CL-ML	A-4	0	80 - 100	75 - 100	65 - 90	45 - 60	25 - 35	5 - 10
		50	Weathered bedrock	-	-	-	-	-	-	-	-	-
182, 183, 184	Neuns	0 - 3	Gravelly loam.	SM, GM	A-4	0 - 5	55 - 80	50 - 75	40 - 60	35 - 50	15 - 25	NP - 5
		3 - 34	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0 - 10	30 - 55	25 - 50	20 - 45	10 - 35	15 - 25	NP - 5
		34	Unweathered bedrock	-	-	-	-	-	-	-	-	-
185	Neuns	0 - 3	Gravelly loam.	SM, GM	A-4	0 - 5	55 - 80	50 - 75	40 - 60	35 - 50	15 - 25	NP - 5
		3 - 34	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0 - 10	30 - 55	25 - 50	20 - 45	10 - 35	15 - 25	NP - 5
		34	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Lithic xerumbrepts.											
	Rock outcrop.											
186*	Neuns	0 - 3	Gravelly loam.	SM, GM	A-4	0 - 5	55 - 80	50 - 75	40 - 60	35 - 50	15 - 25	NP - 5
		3 - 24	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	5 - 10	30 - 55	25 - 50	20 - 45	10 - 30	15 - 25	NP - 5
		34	Unweathered bedrock	-	-	-	-	-	-	-	-	-
	Mieruf	0 - 6	Very gravelly loam.	GM	A-2	0	50 - 55	45 - 50	30 - 45	20 - 40	25 - 35	NP - 10
		6 - 25	Gravelly loam, gravelly silt loam, gravelly fine sandy loam.	GM,GM-GC, SM, SM-SC	A-4	0	55 - 80	50 - 75	45 - 65	35 - 50	25 - 35	5 - 10
		25 - 50	Loam, silt loam, fine sandy loam.	SM, SM-SC, ML, CL-ML	A-4	0	80 - 100	75 - 100	65 - 90	45 - 60	25 - 35	5 - 10
		50	Weathered bedrock	-	-	-	-	-	-	-	-	-

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number -				Liquid Limit	Plasticity Index
		(In.)		Unified	AASHTO	(Pct.)	4	10	40	200	(Pct.)	
187*	Notned	0 - 16	Bouldery coarse sandy loam.	SM	A-1, A-2	15 - 25	70 - 95	65 - 90	30 - 50	20 - 35	-	NP
		16 - 62	Very cobbly coarse sandy loam, very cobbly sandy loam.	SM, GM	A-1, A-2	35 - 55	55 - 75	50 - 70	25 - 40	20 - 30	-	NP
	Gerle	0 - 12	Coarse sandy loam.	SM, SM -SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		12 - 41	Sandy loam, coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		41 - 62	Cobbly sandy loam, gravelly sandy loam.	SM	A-2	0 - 40	70 - 95	60 - 90	40 - 60	25 - 35	20 - 30	NP - 5
188*, 189*	Notned	0 - 16	Bouldery coarse sandy loam.	SM	A-1, - A-2	15 - 25	70 - 95	65 - 90	30 - 50	20 - 35	-	NP
		16 - 62	Very cobbly coarse sandy loam, very cobbly sandy loam.	SM, GM	A-1, A-2	35 - 55	55 - 75	50 - 70	25 - 40	20 - 30	-	NP
	Ledford	0 - 12	Sandy loam.	SM	A-2	0	85 - 100	75 - 95	45 - 60	25 - 35	-	NP
		12 - 37	Gravelly sandy loam, gravelly coarse sandy loam.	SM	A-1, A-2	0	85 - 90	50 - 75	30 - 50	20 - 30	20 - 30	NP - 5
		37 - 47	Gravelly sandy loam, very gravelly sandy loam, gravelly coarse sandy loam.	SM, GM	A-1, A-2	0	45 - 85	35 - 70	25 - 50	15 - 30	20 - 30	NP - 5
		47	Weathered bedrock	-	-	-	-	-	-	-	-	-
190*	Notned	0 - 16	Bouldery coarse sandy loam.	SM	A-1, A-2	15 - 25	70 - 95	65 - 90	30 - 50	20 - 35	-	NP
		16 - 62	Very cobbly coarse sandy loam, very cobbly sandy loam.	SM, GM	A-1, A-2	35 - 55	55 - 75	50 - 70	25 - 40	20 - 30	-	NP
	Rock Outcrop											

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
191*	Ochrepts.											
	Rock Outcrop											
192, 193	Pilliken	0 - 25	Coarse sandy loam.	SM	A-2, A-4	0	85 - 100	75 - 95	50 - 65	20 - 40	20 - 30	NP - 5
		25 - 58	Gravelly coarse sandy loam, gravelly loamy coarse sand.	SM	A-1, A-2	0	70 - 85	60 - 75	35 - 50	15 - 35	20 - 30	NP - 5
		58	Weathered bedrock	-	-	-	-	-	-	-	-	-
194*	Pilliken	0 - 25	Coarse sandy loam.	SM	A-2, A-4	0	85 - 100	75 - 95	50 - 65	20 - 40	20 - 30	NP - 5
		25 - 58	Gravelly coarse sandy loam, gravelly loamy coarse sand.	SM	A-1, A-2	0	70 - 85	60 - 75	35 - 50	15 - 35	20 - 30	NP - 5
		58	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Rock.											
195*	Pilliken	0 - 25	Coarse sandy loam.	SM	A-2, A-4	0	85 - 100	75 - 95	50 - 65	20 - 40	20 - 30	NP - 5
		25 - 58	Gravelly coarse sandy loam, gravelly loamy coarse sand.	SM	A-1, A-2	0	70 - 85	60 - 75	35 - 50	15 - 35	20 - 30	NP - 5
		58	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Rock outcrop.											
196*.	Pits											
0485*.	Rock outcrop.											
198*	Rock outcop.											
199*	Rock outcrop.											
	Cryumbrepts.											

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
200*	Rock outcrop.											
	Tinker	0 - 18	Very cobbly sandy loam.	GM, SM	A-1, A-2	35 - 55	55 - 75	50 - 70	30 - 50	20 - 35	20 - 30	NP - 5
		18 - 36	Very cobbly loam, very cobbly sandy loam, very cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 50	55 - 80	50 - 75	30 - 50	20 - 35	20 - 30	NP - 5
		36 - 41	Cemented	-	-	-	-	-	-	-	-	-
		41 - 60	Very cobbly coarse sandy loam, extremely cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 55	30 - 80	25 - 75	20 - 50	10 - 35	20 - 30	NP - 5
201, 202	Tallac	0 - 29	Very cobbly sandy loam.	GM, SM	A-1, A-2	30 - 55	50 - 70	45 - 65	15 - 35	10 - 35	-	NP
		29 - 61	Very gravelly coarse sandy loam, very gravelly loam.	GM	A-1, A-2	5 - 20	35 - 55	30 - 50	15 - 30	10 - 30	-	NP
203*	Tallac	0 - 29	Very cobbly sandy loam.	GM, SM	A-1, A-2	30 - 55	50 - 70	45 - 65	15 - 35	10 - 35	-	NP
		29 - 61	Very gravelly coarse sandy loam, very gravelly loam.	GM	A-1, A-2	5 - 20	35 - 55	30 - 50	15 - 30	10 - 30	-	NP
	Cryumbrepts.											

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
204*	Tallac Variant	0 - 3	Gravelly fine sandy loam.	SM	A-2	5 - 15	60 - 75	55 - 70	40 - 60	25 - 35	20 - 30	NP - 5
		3 - 23	Very gravelly fine sandy loam.	SM, GM	A-1	10 - 25	40 - 60	35 - 55	25 - 45	15 - 25	20 - 30	NP - 5
		23 - 38	Very cobbly fine sandy loam, very stony sandy loam.	GM, SM	A-1	25 - 45	45 - 65	40 - 60	25 - 45	15 - 25	20 - 30	NP - 5
		38	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Lithic Xerumbrepts.											
	Rock outcrop.											
205	Tinker	0 - 18	Very cobbly coarse sandy loam.	GM, SM	A-1, A-2	35 - 55	55 - 75	50 - 70	30 - 50	20 - 35	20 - 30	NP - 5
		18 - 36	Very cobbly loam, very cobbly sandy loam, very cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 50	55 - 80	50 - 75	30 - 50	20 - 35	20 - 30	NP - 5
		36 - 41	Cemented	-	-	-	-	-	-	-	-	-
		41 - 60	Very cobbly coarse sandy loam, extremely cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 55	30 - 80	25 - 75	20 - 50	10 - 35	20 - 30	NP - 5

TABLE 5 - ENGINEERING INDEX PROPERTIES

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
206*	Tinker	0 - 18	Very cobbly coarse sandy loam.	GM, SM	A-1, A-2	35 - 55	55 - 75	50 - 70	30 - 50	20 - 35	20 - 30	NP - 5
		18 - 36	Very cobbly loam, very cobbly sandy loam, very cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 50	55 - 80	50 - 75	30 - 50	20 - 35	20 - 30	NP - 5
		36 - 41	Cemented	-	-	-	-	-	-	-	-	-
		41 - 60	Very cobbly coarse sandy loam, extremely cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 55	30 - 80	25 - 75	20 - 50	10 - 35	20 - 30	NP - 5
	Cryumbrept.											
	Rock outcrop.											
207*	Tinker	0 - 18	Very cobbly coarse sandy loam.	GM, SM	A-1, A-2	35 - 55	55 - 75	50 - 70	30 - 50	20 - 35	20 - 30	NP - 5
		18 - 36	Very cobbly loam, very cobbly sandy loam, very cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 50	55 - 80	50 - 75	30 - 50	20 - 35	20 - 30	NP - 5
		36 - 41	Cemented	-	-	-	-	-	-	-	-	-
		41 - 60	Very cobbly coarse sandy loam, extremely cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 55	30 - 80	25 - 75	20 - 50	10 - 35	20 - 30	NP - 5

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
208*, 209*	Tinker	0 - 18	Very cobbly coarse sandy loam.	GM, SM	A-1, A-2	35 - 55	55 - 75	50 - 70	30 - 50	20 - 35	20 - 30	NP - 5
		18 - 36	Very cobbly loam, very cobbly sandy loam, very cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 50	55 - 80	50 - 75	30 - 50	20 - 35	20 - 30	NP - 5
		36 - 41	Cemented	-	-	-	-	-	-	-	-	-
		41 - 60	Very cobbly coarse sandy loam, extremely cobbly coarse sandy loam.	GM, SM	A-1, A-2	40 - 55	30 - 80	25 - 75	20 - 50	10 - 35	20 - 30	NP - 5
	Tallac	0 - 29	Very cobbly sandy loam.	GM, SM	A-1, A-2	30 - 55	50 - 70	45 - 65	15 - 35	10 - 35	-	NP
		29 - 61	Very gravelly coarse sandy loam, very gravelly loam.	GM	A-1, A-2	5 - 20	35 - 55	30 - 50	15 - 30	10 - 30	-	NP
		61 - 70	Cemented	-	-	-	-	-	-	-	-	-
	Rock outcrop.											
210*	Umbrept.											
	Tallac	0 - 29	Very cobbly sandy loam.	GM	A-1	5 - 10	35 - 55	30 - 50	15 - 30	10 - 20	-	NP
		29 - 61	Very gravelly coarse sandy loam, very gravelly loam.	GM	A-1, A-2	5 - 20	35 - 55	30 - 50	15 - 30	10 - 30	-	NP
		61 - 70	Cemented	-	-	-	-	-	-	-	-	-
	Gerle	0 - 12	Coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		12 - 41	Sandy loam, coarse sandy loam.	SM, SM-SC	A-2, A-4	0 - 15	85 - 100	75 - 95	50 - 65	25 - 50	20 - 30	NP - 10
		41 - 62	Cobbly sandy loam, gravelly sandy loam.	SM	A-2	0 - 40	70 - 95	60 - 90	40 - 60	25 - 35	20 - 30	NP - 5

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number -				Liquid Limit	Plasticity Index
		(In.)		Unified	AASHTO	(Pct.)	4	10	40	200	(Pct.)	
211, 212	Waca	0 - 9	Cobbly sandy loam.	GM, SM	A-1, A-2	10 - 20	55 - 80	50 - 75	35 - 50	20 - 30	-	NP
		9 - 27	Very cobbly coarse sandy loam, very cobbly sandy loam, very cobbly loam.	GM	A-1	20 - 30	35 - 60	30 - 50	20 - 35	10 - 25	-	NP
		27	Weathered bedrock	-	-	-	-	-	-	-	-	-
213	Waca	0 - 9	Cobbly sandy loam.	GM, SM	A-1, A-2	10 - 20	55 - 80	50 - 75	35 - 50	20 - 30	-	NP
		9 - 27	Very cobbly coarse sandy loam, very cobbly sandy loam, very cobbly loam.	GM	A-1	20 - 30	35 - 60	30 - 50	20 - 35	10 - 25	-	NP
		27	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Lithic cryumbrepts.											
214*, 215*	Waca	0 - 9	Cobbly sandy loam.	GM, SM	A-1, A-2	10 - 20	55 - 80	50 - 75	35 - 50	20 - 30	-	NP
		9 - 27	Very cobbly coarse sandy loam, very cobbly sandy loam, very cobbly loam.	GM	A-1	20 - 30	35 - 60	30 - 50	20 - 35	10 - 25	-	NP
		27	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Lithic cryumbrepts.											
	Cryumbrepts.											

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification Unified	Classification AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
216*, 217*	Waca	0 - 9	Cobbly sandy loam.	GM, SM	A-1, A-2	10 - 20	55 - 80	50 - 75	35 - 50	20 - 30	-	NP
		9 - 27	Very cobbly coarse sandy loam, very cobbly sandy loam, very cobbly loam.	GM	A-1	20 - 30	35 - 60	30 - 50	20 - 35	10 - 25	-	NP
		27	Weathered bedrock	-	-	-	-	-	-	-	-	-
	Windy	0 - 7	Gravelly sandy loam.	GM, SM	A-2, A-1	0 - 15	55 - 80	50 - 75	35 - 55	20 - 35	-	NP
		7 - 16	Very cobbly sandy loam, very cobbly loam.	GM, SM	A-1	30 - 50	40 - 70	35 - 65	25 - 40	10 - 25	-	NP
		16 - 62	Very gravelly sandy loam, very gravelly loam.	GM	A-1	5 - 20	35 - 60	30 - 55	20 - 35	10 - 25	-	NP
218, 219	Windy	0 - 7	Gravelly sandy loam.	GM, SM	A-2, A-1	0 - 15	55 - 80	50 - 75	35 - 55	20 - 35	-	NP
		7 - 16	Very cobbly sandy loam, very cobbly loam.	GM, SM	A-1	30 - 50	40 - 70	35 - 65	25 - 40	10 - 25	-	NP
		16 - 62	Very gravelly sandy loam, very gravelly loam.	GM	A-1	5 - 20	35 - 60	30 - 55	20 - 35	10 - 25	-	NP
220*	Xerumbrepts.											
	Cryumbrepts.											
221, 222	Zeibright	0 - 10	Extremely gravelly coarse sandy loam.	GM	A-1	40 - 55	35 - 45	30 - 40	20 - 35	10 - 20	20 - 30	NP - 5
		10 - 61	Very cobbly fine sandy loam, very cobbly sandy loam, extremely cobbly sandy loam.	SM, GM	A-1, A-2	40 - 65	50 - 70	45 - 65	35 - 60	20 - 35	20 - 30	NP - 5

TABLE 5 - ENGINEERING INDEX PROPERTIES (CONT'D)

Map Symbol	Soil Name	Depth (In.)	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches (Pct.)	Percentage passing sieve number - 4	10	40	200	Liquid Limit (Pct.)	Plasticity Index
223	Zeibright	0 - 23	Gravelly sandy loam.	SM, GM	A-2, A-4	15 - 20	65 - 75	60 - 70	40 - 60	25 - 45	20 - 30	NP - 5
		23 - 61	Very cobbly fine sandy loam, very cobbly sandy loam, extremely cobbly sandy loam.	SM, GM	A-1, A-2	40 - 65	50 - 70	45 - 65	35 - 60	20 - 35	20 - 30	NP - 5
224*	Zeibright	0 - 10	Extremely gravelly coarse sandy loam.	GM	A-1	40 - 55	35 - 45	30 - 40	20 - 35	10 - 20	20 - 30	NP - 5
		10 - 61	Very cobbly fine sandy loam, very cobbly sandy loam, extremely cobbly sandy loam.	SM, GM	A-1, A-2	40 - 65	50 - 70	45 - 65	35 - 60	20 - 35	20 - 30	NP - 5
	Rock outcrop.											
W*.	Water											

TABLE 6- PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol< means less than; > means more than. Entries under "Erosion factors -T" apply to the entire profile. Entries under "Organic matter" apply only to the surface Layer. Absence of an entry indicates that data were not available or were not estimated).

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Organic Matter (Pct.)
101*	Aiken	0 - 16	20 - 27	0.6 - 2.0	0.14 - 0.17	5.6 - 6.5	Low	0.20	5	2 - 10
		16 - 36	27 - 40	0.6 - 2.0	0.16 - 0.18	5.6 - 6.0	Moderate	0.28		
		36 - 80	40 - 50	0.2 - 0.6	0.15 - 0.17	4.5 - 6.0	Moderate	0.28		
	Cohasset	0 - 19	15 - 25	0.6 - 2.0	0.13 - 1.17	5.1 - 6.5	Low	0.17	3	2 - 10
		19 - 44	25 - 35	0.6 - 2.0	0.12 - 0.17	4.5 - 6.0	Moderate	0.15		
		44	-	-	-	-	-	-		
102*	Andic cryumbrepts									
	Lithic cryumbrepts									
103*	Aquepts									
	Umbrepts									
104*	Bighill	0 - 5	5 - 15	2.0 - 6.0	0.10 - 0.12	5.6 - 6.5	Low	0.20	2	2 - 10
		5 - 17	5 - 15	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.15		
		17 - 32	6 - 18	2.0 - 6.0	0.08 - 0.10	5.1 - 6.0	Low	0.15		
		32	-	-	-	-	-	-		
	Musick	0 - 6	10 - 20	0.6 - 2.0	0.14 - 0.16	5.6 - 6.5	Low	0.32	5	2 - 8
		6 - 43	21 - 35	0.2 - 0.6	0.15 - 0.18	5.1 - 6.5	Moderate	0.32		
		43 - 68	15 - 25	0.2 - 0.6	0.12 - 0.15	5.1 - 6.0	Low	0.32		
		68 - 71	5 - 15	0.6 - 2.0	0.10 - 0.14	5.1 - 6.0	Low	0.32		
105*	Bighill	0 - 5	5 - 15	2.0 - 6.0	0.10 - 0.12	5.6 - 6.5	Low	0.20	2	2 - 10
		5 - 17	5 - 15	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.15		
		17 - 32	6 - 18	2.0 - 6.0	0.08 - 0.10	5.1 - 6.0	Low	0.15		
		32	-	-	-	-	-	-		
	Rock outcrop.									
	Dome	0 - 7	5 - 18	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.20	3	2 - 6
		7 - 60	5 - 18	2.0 - 6.0	0.07 - 0.09	5.1 - 6.0	Low	0.20		
106	Chaix	0 - 5	5 - 15	2.0 - 6.0	0.07 - 0.11	5.6 - 6.5	Low	0.24		
		5 - 30	5 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 6.0	Low	0.24		
		30	-	-	-	-	-	-		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Organic Matter (Pct.)
107*,108*	Chaix	0 - 5	5 - 15	2.0 - 6.0	0.07 - 0.11	5.6 - 6.5	Low	0.24	2	2 - 6
		5 - 30	5 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 6.0	Low	0.24		
		30	-	-	-	-	-	-		
	Pilliken	0 - 25	8 - 18	2.0 - 6.0	0.08 - 0.13	6.1 - 7.3	Low	0.20	3	1 - 3
		25 - 58	8 - 18	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		
		58	-	-	-	-	-	-		
109*	Chaix	0 - 5	5 - 15	2.0 - 6.0	0.07 - 0.11	5.6 - 6.5	Low	0.24	2	2 - 6
		5 - 30	5 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 6.0	Low	0.24		
		30	-	-	-	-	-	-		
	Rock outcrop.									
110	Cohasset	0 - 19	15 - 25	0.6 - 2.0	0.13 - 1.17	5.1 - 6.5	Low	0.17	3	2 - 10
		19 - 44	25 - 35	0.6 - 2.0	0.12 - 0.17	4.5 - 6.0	Moderate	0.15		
		44	-	-	-	-	-	-		
111*	Cohasset	0 - 7	15 - 25	0.6 - 2.0	0.11 - 0.15	5.1 - 6.5	Low	0.10	3	2 - 10
		7 - 56	25 - 35	0.6 - 2.0	0.12 - 0.17	4.5 - 6.0	Moderate	0.15		
		56 - 61	25 - 35	0.6 - 2.0	0.11 - 0.16	4.5 - 6.0	Moderate	0.15		
		61	-		-	-	-	-		
	Hartless Variant	0 - 12	4 - 14	2.0 - 6.0	0.05 - 0.08	5.6 - 6.5	Low	0.10	3	2 - 4
		12 - 21	5 - 16	2.0 - 6.0	0.06 - 0.10	5.6 - 6.5	Low	0.10		
		21 - 41	5 - 16	2.0 - 6.0	0.04 - 0.07	5.1 - 6.0	Low	0.10		
		41 - 60	0 - 5	2.0 - 6.0	0.05 - 0.07	5.6 - 6.0	Low	0.17		
112*,113*	Cohasset	0 - 19	15 - 25	0.6 - 2.0	0.13 - 1.17	5.1 - 6.5	Low	0.17	3	2 - 10
		19 - 44	25 - 35	0.6 - 2.0	0.12 - 0.17	4.5 - 6.0	Moderate	0.15		
		44	-	-	-	-	-	-		
	McCarthy	0 - 22	5 - 15	2.0 - 6.0	0.08 - 0.10	5.6 - 6.5	Low	0.10	2	2 - 10
		22 - 26	5 - 15	2.0 - 6.0	0.07 - 0.10	5.1 - 6.5	Low	0.10		
		26	-	-	-	-	-	-		
114*,115*	Cohasset	0 - 5	15 - 25	0.6 - 2.0	0.11 - 0.15	5.1 - 6.5	Low	0.10	3	2 - 10
		5 - 57	25 - 35	0.6 - 2.0	0.12 - 0.17	4.5 - 6.0	Moderate	0.15		
		57	-	-	-	-	-	-		
	McCarthy	0 - 24	5 - 15	2.0 - 6.0	0.08 - 0.10	5.6 - 6.5	Low	0.10	2	2 - 10
		24	-	-	-	-	-	-		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	Erosion Factors T	Organic Matter (Pct.)
116*, 117*	Crozier	0 - 16	15 - 25	0.6 - 2.0	0.13 - 0.17	5.6 - 6.5	Low	0.24	2	2 - 6
		16 - 34	25 - 35	0.6 - 2.0	0.10 - 0.15	5.1 - 6.0	Low	0.20		
		34	-	-	-	-	-	-		
	Cohasset	0 - 19	15 - 25	0.6 - 2.0	0.13 - 1.17	5.1 - 6.5	Low	0.17	3	2 - 10
		19 - 44	25 - 35	0.6 - 2.0	0.12 - 0.17	4.5 - 6.0	Moderate	0.15		
		44	-	-	-	-	-	-		
118*,119*	Crozier	0 - 16	15 - 25	0.6 - 2.0	0.13 - 0.17	5.6 - 6.5	Low	0.24	2	2 - 6
		16 - 34	25 - 35	0.6 - 2.0	0.10 - 0.15	5.1 - 6.0	Low	0.20		
		34	-	-	-	-	-	-		
	McCarthy	0 - 22	5 - 15	2.0 - 6.0	0.08 - 0.10	5.6 - 6.5	Low	0.10	2	2 - 10
		22 - 26	5 - 15	2.0 - 6.0	0.07 - 0.10	5.1 - 6.5	Low	0.10		
		26	-	-	-	-	-	-		
120*	Cryumbrepts.									
121	Dome	0 - 7	5 - 18	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.20	3	2 - 6
		7 - 60	5 - 18	2.0 - 6.0	0.07 - 0.09	5.1 - 6.0	Low	0.20		
122*,123*	Dome	0 - 7	5 - 18	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.20	3	2 - 6
		7 - 60	5 - 18	2.0 - 6.0	0.07 - 0.09	5.1 - 6.0	Low	0.20		
	Zeibright	0 -10	5 - 15	2.0 - 6.0	0.09 - 0.13	6.1 - 6.5	Low	0.17	4	2 - 5
		10 - 61	5 - 15	2.0 - 6.0	0.05 - 0.10	5.1 - 6.0	Low	0.10		
124	Dome Variant	0 - 22	8 - 18	2.0 - 6.0	0.10 - 0.12	5.1 - 6.0	Low	0.20	5	2 - 4
		22 - 55	8 - 18	2.0 - 6.0	0.10 - 0.12	5.1 - 6.0	Low	0.20		
		55 - 60	0 - 10	6.0 - 20.0	0.06 - 0.08	5.1 - 6.0	Low	0.15		
125.	Fluvents									
126	Gerle	0 - 12	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17	5	1 - 3
		12 - 41	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17		
		41 - 62	8 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
127*	Gerle	0 - 12	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17	5	1 - 3
		12 - 41	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17		
		41 - 62	8 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		
	Notned	0 - 16	5 - 10	2.0 - 6.0	0.07 - 0.09	5.1 - 6.0	Low	0.10	5	6 - 9
		16 - 62	5 - 10	2.0 - 6.0	0.05 - 0.07	5.1 - 6.0	Low	0.10		
128*, 129*	Gerle	0 - 12	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17	5	1 - 3
		12 - 41	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17		
		41 - 62	8 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		
	Tallac	0 - 29	3 - 9	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.10	3	3 - 8
		29 - 61	3 - 9	2.0 - 6.0	0.03 - 0.06	5.6 - 6.5	Low	0.10		
130*	Gerle	0 - 12	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17	5	1 - 3
		12 - 41	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17		
		41 - 62	8 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		
	Umbrepts.									
131*	Hangtown	0 - 3	8 - 15	2.0 - 6.0	0.09 - 0.11	5.1 - 6.0	Low	0.20	3	5 - 10
		3 - 24	10 - 15	2.0 - 6.0	0.05 - 0.08	5.1 - 6.0	Low	0.15		
		24 - 46	10 - 15	2.0 - 6.0	0.05 - 0.08	5.1 - 6.0	Low	0.15		
		46	-	-	-	-	-	-		
	Lithic xerumbrepts.									
132*,133*	Hangtown	0 - 3	8 - 15	2.0 - 6.0	0.09 - 0.11	5.1 - 6.0	Low	0.20	3	5 - 10
		3 - 24	10 - 15	2.0 - 6.0	0.05 - 0.08	5.1 - 6.0	Low	0.15		
		24 - 46	10 - 15	2.0 - 6.0	0.05 - 0.08	5.1 - 6.0	Low	0.15		
		46	-	-	-	-	-	-		
132*,133*	Smokey	0 - 3	10 - 20	0.6 - 2.0	0.11 - 0.11	4.5 - 5.5	Low	0.20	2	1 - 3
		3 - 16	10 - 20	0.6 - 2.0	0.05 - 0.10	4.5 - 5.5	Low	0.10		
		16 - 38	10 - 20	0.6 - 6.0	0.03 - 0.09	4.5 - 5.5	Low	0.10		
		38	-	-	-	-	-	-		
134, 135	Hartless	0 - 7	10 - 20	0.6 - 2.0	0.06 - 0.08	5.1 - 6.0	Low	0.15	4	2 - 10
		7 - 58	10 - 18	0.6 - 2.0	0.06 - 0.08	4.5 - 5.5	Low	0.15		
		58 - 64	10 - 18	0.6 - 2.0	0.04 - 0.06	4.5 - 5.5	Low	0.10		
		64	-	-	-	-	-	-		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
136*,137*, 138*	Hartless	0 - 7	10 - 20	0.6 - 2.0	0.06 - 0.08	5.1 - 6.0	Low	0.15	4	2 - 10
		7 - 58	10 - 18	0.6 - 2.0	0.06 - 0.08	4.5 - 5.5	Low	0.15		
		58 - 64	10 - 18	0.6 - 2.0	0.04 - 0.06	4.5 - 5.5	Low	0.10		
		64	-	-	-	-	-	-		
	Mieruf	0 - 6	15 - 24	0.6 - 2.0	0.08 - 0.10	5.1 - 6.0	Low	0.15	4	4 - 10
		6 - 25	15 - 27	0.6 - 2.0	0.11 - 0.13	4.5 - 5.5	Low	0.17		
		25 - 50	15 - 27	0.6 - 2.0	0.14 - 0.16	4.5 - 5.5	Low	0.24		
		50	-	-	-	-	-	-		
139*,140*	Hartless	0 - 7	10 - 20	0.6 - 2.0	0.06 - 0.08	5.1 - 6.0	Low	0.15	4	2 - 10
		7 - 58	10 - 18	0.6 - 2.0	0.06 - 0.08	4.5 - 5.5	Low	0.15		
		58 - 64	10 - 18	0.6 - 2.0	0.04 - 0.06	4.5 - 5.5	Low	0.10		
		64	-	-	-	-	-	-		
	Neuns	0 - 3	6 - 17	0.6 - 2.0	0.09 - 0.13	5.1 - 6.5	Low	0.15	2	<1
		3 - 34	8 - 18	0.6 - 2.0	0.05 - 0.08	5.1 - 6.5	Low	0.10		
		34	-	-	-	-	-	-		
141	Hartless Variant	0 - 12	4 - 14	2.0 - 6.0	0.05 - 0.08	5.6 - 6.5	Low	0.10	3	2 - 4
		12 - 21	5 - 16	2.0 - 6.0	0.06 - 0.10	5.6 - 6.5	Low	0.10		
		21 - 41	5 - 16	2.0 - 6.0	0.04 - 0.07	5.1 - 6.0	Low	0.10		
		41 - 60	0 - 5	2.0 - 6.0	0.05 - 0.07	5.6 - 6.0	Low	0.17		
142, 143	Holland	0 - 8	12 - 25	0.6 - 2.0	0.14 - 0.16	5.1 - 6.5	Low	0.32	5	2 - 5
		8 - 56	25 - 35	0.2 - 0.6	0.14 - 0.18	5.1 - 6.0	Moderate	0.24		
		56 - 64	10 - 20	0.6 - 2.0	0.10 - 0.16	5.1 - 6.0	Low	0.32		
144*, 145*	Holland	0 - 8	12 - 25	0.6 - 2.0	0.14 - 0.16	5.1 - 6.5	Low	0.32	5	2 - 5
		8 - 56	25 - 35	0.2 - 0.6	0.14 - 0.18	5.1 - 6.0	Moderate	0.24		
		56 - 64	10 - 20	0.6 - 2.0	0.10 - 0.16	5.1 - 6.0	Low	0.32		
	Bighill	0 - 5	5 - 15	2.0 - 6.0	0.10 - 0.12	5.6 - 6.5	Low	0.20	2	2 - 10
		5 - 17	5 - 15	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.15		
		17 - 32	6 - 18	2.0 - 6.0	0.08 - 0.10	5.1 - 6.0	Low	0.15		
		32	-	-	-	-	-	-		
146*,147*	Holland	0 - 8	12 - 25	0.6 - 2.0	0.14 - 0.16	5.1 - 6.5	Low	0.32	5	2 - 5
		8 - 56	25 - 35	0.2 - 0.6	0.14 - 0.18	5.1 - 6.0	Moderate	0.24		
		56 - 64	10 - 20	0.6 - 2.0	0.10 - 0.16	5.1 - 6.0	Low	0.32		
	Musick	0 - 6	10 - 20	0.6 - 2.0	0.14 - 0.16	5.6 - 6.5	Low	0.32	5	2 - 8
		6 - 43	21 - 35	0.2 - 0.6	0.15 - 0.18	5.1 - 6.5	Moderate	0.32		
		43 - 68	15 - 25	0.2 - 0.6	0.12 - 0.15	5.1 - 6.0	Low	0.32		
		68 - 71	5 - 15	0.6 - 2.0	0.10 - 0.14	5.1 - 6.0	Low	0.32		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
148*,149*	Holland	0 - 8	12 - 25	0.6 - 2.0	0.14 - 0.16	5.1 - 6.5	Low	0.32	5	2 - 5
		8 - 56	25 - 35	0.2 - 0.6	0.14 - 0.18	5.1 - 6.0	Moderate	0.24		
		56 - 64	10 - 20	0.6 - 2.0	0.10 - 0.16	5.1 - 6.0	Low	0.32		
	Pilliken	0 - 25	8 - 18	2.0 - 6.0	0.08 - 0.13	6.1 - 7.3	Low	0.20	3	1 - 3
		25 - 58	8 - 18	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		
		58	-	-	-	-	-	-		
150, 151	Jocal	0 - 15	15 - 27	0.6 - 2.0	0.13 - 0.17	5.6 - 6.5	Low	0.32	4	2 - 5
		15 - 45	27 - 35	0.6 - 2.0	0.15 - 0.19	5.1 - 6.0	Moderate	0.32		
		45 - 70	25 - 35	0.6 - 2.0	0.13 - 0.15	5.1 - 6.0	Moderate	0.28		
		70	-	-	-	-	-	-		
152*,153*	Jocal	0 - 15	15 - 27	0.6 - 2.0	0.13 - 0.17	5.6 - 6.5	Low	0.32	4	2 - 5
		15 - 45	27 - 35	0.6 - 2.0	0.15 - 0.19	5.1 - 6.0	Moderate	0.32		
		45 - 70	25 - 35	0.6 - 2.0	0.13 - 0.15	5.1 - 6.0	Moderate	0.28		
		70	-	-	-	-	-	-		
	Hartless	0 - 11	10 - 20	0.6 - 2.0	0.06 - 0.08	5.1 - 6.0	Low	0.15	4	2 - 10
		11 - 47	10 - 18	0.6 - 2.0	0.06 - 0.08	4.5 - 5.5	Low	0.15		
		47	-	-	-	-	-	-		
154*	Jocal	0 - 15	15 - 27	0.6 - 2.0	0.13 - 0.17	5.6 - 6.5	Low	0.32	4	2 - 5
		15 - 45	27 - 35	0.6 - 2.0	0.15 - 0.19	5.1 - 6.0	Moderate	0.32		
		45 - 70	25 - 35	0.6 - 2.0	0.13 - 0.15	5.1 - 6.0	Moderate	0.28		
		70	-	-	-	-	-	-		
	Mariposa	0 - 5	10 - 20	0.6 - 2.0	0.09 - 0.14	5.1 - 6.5	Low	0.20	2	1 - 3
		5 - 30	20 - 35	0.6 - 2.0	0.10 - 0.14	4.5 - 6.0	Low	0.20		
		30	-	-	-	-	-	-		
	Umbrepts.									
155*	Jocal	0 - 15	15 - 27	0.6 - 2.0	0.13 - 0.17	5.6 - 6.5	Low	0.32	4	2 - 5
		15 - 45	27 - 35	0.6 - 2.0	0.15 - 0.19	5.1 - 6.0	Moderate	0.32		
		45 - 70	25 - 35	0.6 - 2.0	0.13 - 0.15	5.1 - 6.0	Moderate	0.28		
		70	-	-	-	-	-	-		
	Sites	0 - 3	15 - 27	0.6 - 2.0	0.14 - 0.17	5.6 - 6.5	Low	0.28	5	2 - 10
		3 - 61	35 - 60	0.2 - 0.6	0.13 - 0.16	4.5 - 6.0	Moderate	0.28		
		61	-	-	-	-	-	-		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
156	Ledford	0 - 12	5 - 10	6.0 - 20	0.08 - 0.12	5.6 - 6.5	Low	0.20	3	2 - 5
		12 - 37	5 - 15	6.0 - 20	0.07 - 0.10	5.6 - 6.5	Low	0.15		
		37 - 47	5 - 15	6.0 - 20	0.05 - 0.10	5.6 - 6.5	Low	0.10		
		47	-	-	-	-	-	-		
157*, 158*	Ledford	0 - 12	5 - 10	6.0 - 20	0.08 - 0.12	5.6 - 6.5	Low	0.20	3	2 - 5
		12 - 37	5 - 15	6.0 - 20	0.07 - 0.10	5.6 - 6.5	Low	0.15		
		37 - 47	5 - 15	6.0 - 20	0.05 - 0.10	5.6 - 6.5	Low	0.10		
		47	-	-	-	-	-	-		
	Notned	0 - 16	5 - 10	2.0 - 6.0	0.07 - 0.09	5.1 - 6.0	Low	0.10	5	6 - 9
		16 - 62	5 - 10	2.0 - 6.0	0.05 - 0.07	5.1 - 6.0	Low	0.10		
159*,160*	Ledmount	0 - 6	10 - 20	2.0 - 6.0	0.07 - 0.13	5.6 - 6.5	Low	0.20	1	2 - 6
		6 - 15	10 - 20	2.0 - 6.0	0.07 - 0.13	5.6 - 6.5	Low	0.20		
		15	-	-	-	-	-	-		
	Rock Outcrop									
161	Lithic cryumbrepts									
162*, 163*	Lithic cryumbrepts.									
	Waca	0 - 9	5 - 18	2.0 - 6.0	0.08 - 0.12	5.6 - 6.5	Low	0.17	2	3 - 15
		9 - 27	5 - 18	2.0 - 6.0	0.06 - 0.09	5.1 - 6.0	Low	0.17		
		27	-	-	-	-	-	-		
164*	Lithic xerumbrepts.									
	Rock outcrop.									
165, 166	Lumberly	0 - 10	5 - 15	2.0 - 6.0	0.06 - 0.09	5.6 - 6.5	Low	0.20	2	2 - 6
		10 - 33	5 - 15	2.0 - 6.0	0.06 - 0.09	5.6 - 6.5	Low	0.20		
		33	-	-	-	-	-	-		
167, 168	Mariposa	0 - 5	10 - 20	0.6 - 2.0	0.09 - 0.14	5.1 - 6.5	Low	0.20	2	1 - 3
		5 - 30	20 - 35	0.6 - 2.0	0.10 - 0.14	4.5 - 6.0	Low	0.20		
		30	-	-	-	-	-	-		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
169*, 170*	Mariposa	0 - 5	10 - 20	0.6 - 2.0	0.09 - 0.14	5.1 - 6.5	Low	0.20	2	1 - 3
		5 - 30	20 - 35	0.6 - 2.0	0.10 - 0.14	4.5 - 6.0	Low	0.20		
		30	-	-	-	-	-	-		
	Jocal	0 - 15	15 - 27	0.6 - 2.0	0.13 - 0.17	5.6 - 6.5	Low	0.32	4	2 - 5
		15 - 45	27 - 35	0.6 - 2.0	0.15 - 0.19	5.1 - 6.0	Moderate	0.32		
		45 - 70	25 - 35	0.6 - 2.0	0.13 - 0.15	5.1 - 6.0	Moderate	0.28		
		70	-	-	-	-	-	-		
171*, 172*	Mariposa	0 - 5	10 - 20	0.6 - 2.0	0.09 - 0.14	5.1 - 6.5	Low	0.20	2	1 - 3
		5 - 30	20 - 35	0.6 - 2.0	0.10 - 0.14	4.5 - 6.0	Low	0.20		
		30	-	-	-	-	-	-		
	Maymen	0 - 13	10 - 25	0.60 - 2.0	0.08 - 0.14	4.5 - 6.5	Low	0.20	1	<1
		13	-	-	-	-	-	-		
173*, 174*	Maymen	0 - 13	10 - 25	0.6 - 2.0	0.08 - 0.14	4.5 - 6.5	Low	0.20	1	<1
		13	-	-	-	-	-	-		
	Rock outcrop.									
175, 176	McCarthy	0 - 22	5 - 15	2.0 - 6.0	0.08 - 0.10	5.6 - 6.5	Low	0.10	2	2 - 10
		22 - 26	5 - 15	2.0 - 6.0	0.07 - 0.10	5.1 - 6.5	Low	0.10		
		26	-	-	-	-	-	-		
177*,178*	McCarthy	0 - 22	5 - 15	2.0 - 6.0	0.08 - 0.10	5.6 - 6.5	Low	0.10	2	2 - 10
		22 - 26	5 - 15	2.0 - 6.0	0.07 - 0.10	5.1 - 6.5	Low	0.10		
		26	-	-	-	-	-	-		
	Ledmount	0 - 6	10 - 20	2.0 - 6.0	0.07 - 0.13	5.6 - 6.5	Low	0.20	1	2 - 6
		6 - 15	10 - 20	2.0 - 6.0	0.07 - 0.13	5.6 - 6.5	Low	0.20		
		15	-	-	-	-	-	-		
179*	McCarthy	0 - 24	5 - 15	2.0 - 6.0	0.08 - 0.10	5.6 - 6.5	Low	0.10	2	2 - 10
		24	-	-	-	-	-	-		
180,181	Mieruf	0 - 6	15 - 24	0.6 - 2.0	0.08 - 0.10	5.1 - 6.0	Low	0.15	4	4 - 10
		6 - 25	15 - 27	0.6 - 2.0	0.11 - 0.13	4.5 - 5.5	Low	0.17		
		25 - 50	15 - 27	0.6 - 2.0	0.14 - 0.16	4.5 - 5.5	Low	0.24		
		50	-	-	-	-	-	-		
182, 183, 184	Neuns	0 - 3	6 - 17	0.6 - 2.0	0.09 - 0.13	5.1 - 6.5	Low	0.15	2	<1
		3 - 34	8 - 18	0.6 - 2.0	0.05 - 0.08	5.1 - 6.5	Low	0.10		
		34	-	-	-	-	-	-		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
185*	Neuns	0 - 3 3 - 34 34	6 - 17 8 - 18 -	0.6 - 2.0 0.6 - 2.0 -	0.09 - 0.13 0.05 - 0.08 -	5.1 - 6.5 5.1 - 6.5 -	Low Low -	0.15 0.10 -	2	< 1
	Lithic xerumbrepts.									
	Rock outcrop.									
186*	Neuns	0 - 3 3 - 34 34	6 - 17 8 - 18 -	0.6 - 2.0 0.6 - 2.0 -	0.09 - 0.13 0.05 - 0.08 -	5.1 - 6.5 5.1 - 6.5 -	Low Low -	0.15 0.10 -	2	< 1
	Mieruf	0 - 6 6 - 25 25 - 50 50	15 - 24 15 - 27 15 - 27 -	0.6 - 2.0 0.6 - 2.0 0.6 - 2.0 -	0.08 - 0.10 0.11 - 0.13 0.14 - 0.16 -	5.1 - 6.0 4.5 - 5.5 4.5 - 5.5 -	Low Low Low -	0.15 0.17 0.24 -	4	4 - 10
187*	Notned	0 - 16 16 - 62	5 - 10 5 - 10	2.0 - 6.0 2.0 - 6.0	0.07 - 0.09 0.05 - 0.07	5.1 - 6.0 5.1 - 6.0	Low Low	0.10 0.10	5	6 - 9
	Gerle	0 - 12 12 - 41 41 - 62	10 - 18 10 - 18 8 - 15	2.0 - 6.0 2.0 - 6.0 2.0 - 6.0	0.09 - 0.13 0.09 - 0.13 0.07 - 0.11	5.1 - 7.3 5.1 - 7.3 5.1 - 7.3	Low Low Low	0.17 0.17 0.15	5	1 - 3
188*, 189*	Notned	0 - 16 16 - 62	5 - 10 5 - 10	2.0 - 6.0 2.0 - 6.0	0.07 - 0.09 0.05 - 0.07	5.1 - 6.0 5.1 - 6.0	Low Low	0.10 0.10	5	6 - 9
	Ledford	0 - 12 12 - 37 37 - 47 47	5 - 10 5 - 15 5 - 15 -	6.0 - 20 6.0 - 20 6.0 - 20 -	0.08 - 0.12 0.07 - 0.10 0.05 - 0.10 -	5.6 - 6.5 5.6 - 6.5 5.6 - 6.5 -	Low Low Low -	0.20 0.15 0.10 -	3	2 - 5
190*	Notned	0 - 16 16 - 62	5 - 10 5 - 10	2.0 - 6.0 2.0 - 6.0	0.07 - 0.09 0.05 - 0.07	5.1 - 6.0 5.1 - 6.0	Low Low	0.10 0.10	5	6 - 9
	Rock outcrop.									
191*	Ochrepts.									
	Rock outcrop.									
192,193	Pilliken	0 - 25 25 - 58 58	8 - 18 8 - 18 -	2.0 - 6.0 2.0 - 6.0 -	0.08 - 0.13 0.07 - 0.11 -	6.1 - 7.3 5.1 - 7.3 -	Low Low -	0.20 0.15 -	3	1 - 3
194*	Pilliken	0 - 25 25 - 58 58	8 - 18 8 - 18 -	2.0 - 6.0 2.0 - 6.0 -	0.08 - 0.13 0.07 - 0.11 -	6.1 - 7.3 5.1 - 7.3 -	Low Low -	0.20 0.15	3	1 - 3
	Rock .									

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
195*	Pilliken	0 - 25	8 - 18	2.0 - 6.0	0.08 - 0.13	6.1 - 7.3	Low	0.20	3	1 - 3
		25 - 58	8 - 18	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		
		58	-	-	-	-	-	-		
	Rock outcrop.									
196*.	Pits									
0485*.	Riverwash									
198*.	Rock outcrop.									
199*	Rock outcrop.									
	Cryumbrepts.									
200*	Rock outcrop.									
	Tinker	0 - 18	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.0	Low	0.10	2	3 - 8
		18 - 36	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.5	Low	0.15		
		36 - 41	-	-	-	-	-	-		
		41 - 60	5 - 15	2.0 - 6.0	0.03 - 0.08	5.6 - 6.0	Low	0.15		
201,202	Tallac	0 - 29	3 - 9	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.10	3	3 - 8
		29 - 61	3 - 9	2.0 - 6.0	0.03 - 0.06	5.6 - 6.5	Low	0.10		
203*	Tallac	0 - 29	3 - 9	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.10	3	3 - 8
		29 - 61	3 - 9	2.0 - 6.0	0.03 - 0.06	5.6 - 6.5	Low	0.10		
	Cryumbrepts.									
204*	Tallac Variant	0 - 3	5 - 15	2.0 - 6.0	0.07 - 0.11	5.6 - 6.0	Low	0.15	2	2 - 6
		3 - 23	5 - 15	2.0 - 6.0	0.04 - 0.09	5.6 - 6.0	Low	0.10		
		23 - 38	5 - 15	2.0 - 6.0	0.04 - 0.09	5.6 - 6.5	Low	0.10		
		38	-	-	-	-	-	-		
	Lithic xerumbrepts									
	Rock Outcrop									
205	Tinker	0 - 18	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.0	Low	0.10	2	3 - 8
		18 - 36	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.5	Low	0.15		
		36 - 41	-	-	-	-	-	-		
		41 - 60	5 - 15	2.0 - 6.0	0.03 - 0.08	5.6 - 6.0	Low	0.15		

TABLE 6 - PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS (CONT'D)

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion Factors K	T	Organic Matter (Pct.)
206*	Tinker	0 - 18	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.0	Low	0.10	2	3 - 8
		18 - 36	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.5	Low	0.15		
		36 - 41	-	-	-	-	-	-		
		41 - 60	5 - 15	2.0 - 6.0	0.03 - 0.08	5.6 - 6.0	Low	0.15		
	Cryumbrept.									
	Rock outcrop.									
207*	Tinker	0 - 18	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.0	Low	0.10	2	3 - 8
		18 - 36	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.5	Low	0.15		
		36 - 41	-	-	-	-	-	-		
		41 - 60	5 - 15	2.0 - 6.0	0.03 - 0.08	5.6 - 6.0	Low	0.15		
	Tallac	0 - 29	3 - 9	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.10	3	3 - 8
		29 - 61	3 - 9	2.0 - 6.0	0.03 - 0.06	5.6 - 6.5	Low	0.10		
		61 - 70	-	0.06 - 0.2	-	-	-	-		
208*, 209*	Tinker	0 - 18	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.0	Low	0.10	2	3 - 8
		18 - 36	5 - 15	2.0 - 6.0	0.05 - 0.09	5.6 - 6.5	Low	0.15		
		36 - 41	-	-	-	-	-	-		
		41 - 60	5 - 15	2.0 - 6.0	0.03 - 0.08	5.6 - 6.0	Low	0.15		
	Tallac	0 - 29	3 - 9	2.0 - 6.0	0.07 - 0.09	5.6 - 6.5	Low	0.10	3	3 - 8
		29 - 61	3 - 9	2.0 - 6.0	0.03 - 0.06	5.6 - 6.5	Low	0.10		
		61 - 70	-	0.06 - 0.2	-	-	-	-		
	Rock outcrop.									
210*	Umbrept.									
	Tallac	0 - 29	3 - 9	2.0 - 6.0	0.05 - 0.07	5.6 - 6.5	Low	0.05	3	3 - 8
		29 - 61	3 - 9	2.0 - 6.0	0.03 - 0.06	5.6 - 6.5	Low	0.10		
		61 - 70	-	0.06 - 0.2	-	-	-	-		
	Gerle	0 - 12	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17	5	1 - 3
		12 - 41	10 - 18	2.0 - 6.0	0.09 - 0.13	5.1 - 7.3	Low	0.17		
		41 - 62	8 - 15	2.0 - 6.0	0.07 - 0.11	5.1 - 7.3	Low	0.15		
211, 212	Waca	0 - 9	5 - 18	2.0 - 6.0	0.08 - 0.12	5.6 - 6.5	Low	0.17	2	3 - 15
		9 - 27	5 - 18	2.0 - 6.0	0.06 - 0.09	5.1 - 6.0	Low	0.17		
		27	-	-	-	-	-	-		
213*	Waca	0 - 9	5 - 18	2.0 - 6.0	0.08 - 0.12	5.6 - 6.5	Low	0.17	2	3 - 15
		9 - 27	5 - 18	2.0 - 6.0	0.06 - 0.09	5.1 - 6.0	Low	0.17		
		27	-	-	-	-	-	-		
	Lithic Cryumbrepts.									

Map Symbol	Soil Name	Depth (In.)	Clay (Pct.)	Permeability (In./Hr.)	Available Water Capacity (In./In.)	Soil Reaction (pH)	Shrink-Swell Potential	Erosion K	Factors T	Organic Matter (Pct.)
214*, 215*	Waca	0 - 9 9 - 27 27	5 - 18 5 - 18 -	2.0 - 6.0 2.0 - 6.0 -	0.08 - 0.12 0.06 - 0.09 -	5.6 - 6.5 5.1 - 6.0 -	Low Low -	0.17 0.17 -	2	3 - 15
	Lithic Cryumbrepts.									
	Cryumbrepts.									
216*. 217*	Waca	0 - 9 9 - 27 27	5 - 18 5 - 18 -	2.0 - 6.0 2.0 - 6.0 -	0.08 - 0.12 0.06 - 0.09 -	5.6 - 6.5 5.1 - 6.0 -	Low Low -	0.17 0.17 -	2	3 - 15
	Windy	0 - 7 7 - 16 16 - 62	5 - 15 5 - 15 5 - 15	2.0 - 6.0 2.0 - 6.0 2.0 - 6.0	0.08 - 0.10 0.06 - 0.09 0.06 - 0.09	5.1 - 6.5 4.5 - 6.0 4.5 - 6.0	Low Low Low	0.17 0.10 0.10	3	3 - 15
218, 219	Windy	0 - 7 7 - 16 16 - 62	5 - 15 5 - 15 5 - 15	2.0 - 6.0 2.0 - 6.0 2.0 - 6.0	0.08 - 0.10 0.06 - 0.09 0.06 - 0.09	5.1 - 6.5 4.5 - 6.0 4.5 - 6.0	Low Low Low	0.17 0.10 0.10	3	3 - 15
220*	Xerumbrepts.									
	Cryumbrepts.									
221, 222	Zeibright	0 - 10 10 - 61	5 - 15 5 - 15	2.0 - 6.0 2.0 - 6.0	0.04 - 0.09 0.05 - 0.10	6.1 - 6.5 5.1 - 6.0	Low Low	0.10 0.10	4	2 - 5
223	Zeibright	0 - 23 23 - 61	5 - 15 5 - 15	2.0 - 6.0 2.0 - 6.0	0.09 - 0.13 0.05 - 0.10	6.1 - 6.5 5.1 - 6.0	Low Low	0.17 0.10	4	2 - 5
224*	Zeibright	0 - 10 10 - 61	5 - 15 5 - 15	2.0 - 6.0 2.0 - 6.0	0.04 - 0.09 0.05 - 0.10	6.1 - 6.5 5.1 - 6.0	Low Low	0.10 0.10	4	2 - 5
	Rock outcrop.									
W*.	Water									

TABLE 7 - SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare", "brief", "apparent", and "perched" are explained in the text. The symbol < means less than, > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
101*	Aiken	B	None	-	-	> 6.0	-	-	>60	-	-	-	High	High
	Cohasset	B	None	-	-	> 6.0	-	-	40 - 72	Soft	-	-	Moderate	High
102*	Andic cryumbrepts.													
	Lithic cryumbrepts.	-	-	-	-	-	-	-	< 20	Hard	-	-	-	-
103*	Aquepts.	D	Frequent	Long	Nov-Aug	1.0 - 3.0	Apparent	Year round	-	-	-	-	-	-
	Umbrepts.	D	Frequent	Long	Nov-Aug	1.0 - 3.0	Apparent	Year round	-	-	-	-	-	-
104*	Bighill	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
	Musick	B	None	-	-	> 6.0	-	-	>60	-	-	-	-	-
105*	Bighill	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
	Rock Outcrop.													
	Dome	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
106	Chaix	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
107*, 108*	Chaix	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
	Pilliken	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
109*	Chaix	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
	Rock outcrop.													
110	Cohasset	B	None	-	-	> 6.0	-	-	40 - 72	Soft	-	-	Moderate	High
111	Cohasset	B	None	-	-	> 6.0	-	-	40 - 72	Soft	-	-	High	High
	Hartless Variant	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate

TABLE 7 - SOIL AND WATER FEATURES (CONT'D)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
112*, 113*	Cohasset	B	None	-	-	> 6.0	-	-	40 - 72	Soft	-	-	Moderate	High
	McCarthy	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	High	High
114*, 115*	Cohasset	B	None	-	-	> 6.0	-	-	40 - 72	Soft	-	-	High	High
	McCarthy	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	High	High
116*, 117*	Crozier	C	None	-	-	> 6.0	-	-	20 - 40	Hard	-	-	Moderate	Moderate
	Cohasset	B	None	-	-	> 6.0	-	-	40 - 72	Soft	-	-	Moderate	High
118*, 119*	Crozier	C	None	-	-	> 6.0	-	-	20 - 40	Hard	-	-	Moderate	Moderate
	McCarthy	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	High	High
120*	Cryumbrepts.													
121	Dome	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
122*, 123*	Dome	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
	Zeibright	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
124	Dome Variant	C	None	-	-	1.5 - 3.0	Apparent	Nov-Jul	> 60	-	-	-	Moderate	Moderate
125.	Fluvents	C	Occassional	Brief	Nov-June	-	-	-	-	-	-	-	-	-
126	Gerle	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
127	Gerle	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Notned	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
128*, 129*	Gerle	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Tallac	B	None	-	-	3.5 - 5.0	Perched	Mar-May	> 60	-	40 - 60	Thick	Moderate	Moderate
130*	Gerle	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Umbrepts.													

TABLE 7 - SOIL AND WATER FEATURES (CONT'D)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
131*	Hangtown	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
	Lithic xerumbrepts.								< 20	Hard				
132*, 133*	Hangtown	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
	Smokey	C	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	High	High
134, 135	Hartless	B	None	-	-	> 6.0	-	-	40 - 80	Soft	-	-	High	High
136*, 137*, 138*	Hartless	B	None	-	-	> 6.0	-	-	40 - 80	Soft	-	-	High	High
	Mieruf	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	High	High
139*, 140*	Hartless	B	None	-	-	> 6.0	-	-	40 - 80	Soft	-	-	High	High
	Neuns	C	None	-	-	> 6.0	-	-	20 - 40	Hard	-	-	Moderate	Moderate
141	Hartless Variant	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
142, 143	Holland	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
144*, 145*	Holland	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Bighill	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
146*, 147*	Holland	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Musick	B	None	-	-	> 6.0	-	-	> 60	-	-	-	-	-
148*, 149*	Holland	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Pilliken	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
150, 151	Jocal	B	None	-	-	> 6.0	-	-	60 - 80	Soft	-	-	Moderate	Moderate
152*, 153*	Jocal	B	None	-	-	> 6.0	-	-	60 - 80	Soft	-	-	Moderate	Moderate
	Hartless	B	None	-	-	> 6.0	-	-	40 - 80	Soft	-	-	High	High

TABLE 7 - SOIL AND WATER FEATURES (CONT'D)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
154*	Jocal	B	None	-	-	> 6.0	-	-	60 - 80	Soft	-	-	Moderate	Moderate
	Mariposa	C	None	-	-	> 6.0	-	-	12 - 35	Hard	-	-	High	High
	Umbrepts.	D	Frequent	Long	Nov-June	1.0 - 3.0	Apparent	Nov-Aug	-	-	-	-	-	-
155*	Jocal	B	None	-	-	> 6.0	-	-	60 - 80	Soft	-	-	Moderate	Moderate
	Sites	C	None	-	-	> 6.0	-	-	> 60	Soft	-	-	High	High
156	Ledford	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
157*, 158*	Ledford	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
	Notned	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
159* 160*	Ledmount	D	None	-	-	> 6.0	-	-	4 - 20	Hard	-	-	Moderate	Moderate
	Rock outcrop.													
161.	Lithic Cryumbrepts								< 20	Hard				
162*, 163*	Lithic cryumbrepts.								< 20	Hard				
	Waca	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
164	Lithic xerumbrepts.								< 20	Hard				
	Rock Outcrop.													
165, 166	Lumberly	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
167, 168	Mariposa	C	None	-	-	> 6.0	-	-	12 - 35	Hard	-	-	High	High
169* 170*	Mariposa	C	None	-	-	> 6.0	-	-	12 - 35	Hard	-	-	High	High
	Jocal	B	None	-	-	> 6.0	-	-	60 - 80	Soft	-	-	Moderate	Moderate

TABLE 7 - SOIL AND WATER FEATURES (CONT'D)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
171*, 172*	Mariposa	C	None	-	-	> 6.0	-	-	12 - 35	Hard	-	-	High	High
	Maymen	D	None	-	-	> 6.0	-	-	10 - 20	Hard	-	-	High	High
173*, 174*	Maymen	D	None	-	-	> 6.0	-	-	10 - 20	Hard	-	-	High	High
	Rock outcrop.													
175, 176	McCarthy	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	High	High
177*, 178*	McCarthy	B	Nonde	-	-	> 6.0	-	-	20 - 40	Soft	-	-	High	High
	Ledmount	D	None	-	-	> 6.0	-	-	4 - 20	Hard	-	-	Moderate	Moderate
179*	McCarthy	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	High	High
180, 181	Mieruf	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	High	High
182, 183, 184	Neuns	C	None	-	-	> 6.0	-	-	20 - 40	Hard	-	-	Moderate	Moderate
185*	Neuns	C	None	-	-	> 6.0	-	-	20 - 40	Hard	-	-	Moderate	Moderate
	Lithic xerumbrepts.								< 20	Hard				
	Rock outcrop.													
186*	Neuns	C	None	-	-	> 6.0	-	-	20 - 40	Hard	-	-	Moderate	Moderate
	Mieruf	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	High	High
187*	Notned	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Gerle	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
188*, 189*	Notned	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Ledford	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
190*	Notned	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Rock outcrop.													

TABLE 7 - SOIL AND WATER FEATURES (CONT'D)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
191*	Ochrepts.													
	Rock outcrop.													
192, 193	Pilliken	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderatre
194	Pilliken	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
	Rock.													
195*	Pilliken	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	Moderate	Moderate
	Rock outcrop.													
196*.	Pits													
197*.	Riverwash													
198*.	Rock outcrop.													
199*	Rock outcrop.													
	Cryumbrepts.													
200*	Rock outcrop.													
	Tinker	C	None	-	-	> 6.0	-	-	> 60	-	22 - 40	Thick	Moderate	Moderate
201, 202	Tallac	B	None	-	-	3.5 - 5.0	Perched	Mar-May	> 60	-	40 - 60	Thick	Moderate	Moderate
203*	Tallac	B	None	-	-	3.5 - 5.0	Perched	Mar-May	> 60	-	40 - 60	Thick	Moderate	Moderate
	Cryumbrepts.													
204*	Tallac Variant	C	None	-	-	> 6.0	-	-	20 - 40	Hard	-	-	Moderate	Moderate
	Lithic xerumbrepts.	B	-	-	-	-	-	-	< 20	Hard	-	-	-	-
	Rock outcrop.													
205	Tinker	C	None	-	-	> 6.0	-	-	> 60	-	22 - 40	Thick	Moderate	Moderate

TABLE 7 - SOIL AND WATER FEATURES (CONT'D)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
206*	Tinker	C	None	-	-	> 6.0	-	-	> 60	-	22 - 40	Thick	Moderate	Moderate
	Cryumbrept.													
	Rock outcrop.													
207*	Tinker	C	None	-	-	> 6.0	-	-	> 60	-	22 - 40	Thick	Moderate	Moderate
	Tallac	B	None	-	-	3.5 - 5.0	Perched	Mar-May	> 60	-	40 - 60	Thick	Moderate	Moderate
208*, 209*	Tinker	C	None	-	-	> 6.0	-	-	> 60	-	22 - 40	Thick	Moderate	Moderate
	Tallac	B	None	-	-	3.5 - 5.0	Perched	Mar-May	> 60	-	40 - 60	Thick	Moderate	Moderate
	Rock outcrop.													
210*	Umbrept.	D	Frequent	Long	Nov-Aug	1.0 - 3.0	Apparent	Year round						
	Tallac	B	None	-	-	3.5 - 5.0	Perched	Mar-May	> 60	-	40 - 60	Thick	Moderate	Moderate
	Gerle	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
211, 212	Waca	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
213*	Waca	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
	Lithic cryumbrepts.		-	-	-	-	-	-	< 20	Hard	-	-	-	-
214*, 215*	Waca	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
	Lithic cryumbrepts.		-	-	-	-	-	-	< 20	Hard	-	-	-	-
	Cryumbrepts.													
216*, 217*	Waca	B	None	-	-	> 6.0	-	-	20 - 40	Soft	-	-	Moderate	Moderate
	Windy	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	High	High
218, 219	Windy	B	None	-	-	> 6.0	-	-	40 - 60	Soft	-	-	High	High
220*	Xerumbrepts.													
	Cryumbrepts.													

TABLE 7 - SOIL AND WATER FEATURES (CONT'D)

Map Symbol	Soil Name	Hydro-logical Group	Flooding			High water table			Bedrock		Cemented Pan		Risk of Corrosion	
			Frequency	Duration	Months	Depth (Ft)	Kind	Months	Depth (In)	Hardness	Depth (In)	Hardness	Uncoated Steel	Concrete
221, 222, 223	Zeibright	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
224*	Zeibright	B	None	-	-	> 6.0	-	-	> 60	-	-	-	Moderate	Moderate
	Rock outcrop.													
W*.	Water													

Table 8 Classification of the Soils

Soil Name	Family or higher taxonomic class
Aiken	Clayey, oxidic, mesic Xeric Haplohumults
Bighill	Coarse-loamy, mixed, mesic Typic Xerumbrepts
Chaix	Coarse-loamy, mixed, mesic Dystric Xerochrepts
Cohasset	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Crozier	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Dome	Coarse-loamy, mixed, mesic Dystric Xerochrepts
Dome Variant	Coarse-loamy, mixed, mesic Dystric Xerochrepts
Gerle	Coarse-loamy, mixed, frigid Typic Xerumbrepts
Hangtown	Loamy-skeletal, mixed, frigid Dystric Xerochrepts
Hartless	Loamy-skeletal, mixed, mesic Dystric Xerochrepts
Hartless Variant	Loamy-skeletal, mixed, mesic Dystric Xerochrepts
Holland	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Jocal	Fine-loamy, mixed, mesic Typic Haploxerults
Ledford	Coarse-loamy, mixed, frigid Entic Xerumbrepts
Ledmount	Medial, mesic Lithic Xerumbrepts
Lumberly	Coarse-loamy, mixed, frigid Typic Xerumbrepts
Mariposa	Fine-loamy, mixed, mesic Ruptic-Lithic-Xerochreptic Haploxerults
Maymen	Loamy, mixed, mesic Dystric Lithic Xerochepts
McCarthy	Medial-skeletal, mesic Andic Xerumbrepts
Meiruf	Fine-loamy, oxidic, mesic Xeric Haplohumults
Musick	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Neuns	Loamy-skeletal, mixed, mesic Dystric Xerochrepts
Notned	Loamy-skeletal, mixed, frigid Dystric Xerochepts
Pilliken	Coarse-loamy, mixed, mesic Entic Xerumbrepts
Sites	Clayey, oxidic, mesic Xeric Haplohumults
Smokey	Loamy-skeletal, mixed, frigid Dystric Xerochrepts
Tallac	Loamy-skeletal, mixed, frigid Pachic Xerumbrepts
Tallac Variant	Loamy-skeletal, mixed, frigid Pachic Xerumbrepts

Table 8 Classification of the Soils, continued

Soil Name	Family or higher taxonomic class
Tinker	Loamy-skeletal, mixed, frigid Andic Haplumbrepts
Waca	Medial-skeletal, frigid Andic Xerumbrepts
Windy	Medial-skeletal, frigid Andic Xerumbrepts
Zeibright	Loamy-skeletal, mixed, mesic Entic Xerumbrepts

TABLE 9 - CHEMICAL DATA FOR SELECTED SOILS

Analysis by Soil Morphology Laboratory University of California Davis

Series and Laboratory Number	Horizon	Depth	EXTRACTABLE BASES (milliequivalents per 100 grams of soil)				CATION EXCHANGE CAPACITY	BASE SATURATION	ORGANIC MATTER		C/N	pH	P in ppm	Fe as Fe_2O_3 Pct.
		IN.	CA	Mg	Na	K	meq/ 100gr	Pct	Organic Carbon Pct.	Organic Nitrogen Pct.				
BIGHILL	A1	0 to 5	3.9	0.5	0.1	0.4	19.5	25.1	3.77	0.147	26	6.1	10.5	2.3
	A2	5 to 17	1.4	0.2	0.1	0.2	17.9	10.6	2.25	0.083	27	5.8	8.6	2.3
1579	Bw	17 to 32	0.8	0.1	0.1	0.2	10.2	11.8	0.50	0.032	16	5.4	4.5	2.1
	Cr	32 to 39	0.6	0.1	0.1	0.2	7.1	14.1	0.14	0.010	14	5.5	3.7	1.6
CHAIX	A	0 to 3	3.8	0.3	0.1	1.0	18.6	28.0	2.42	0.066	37	5.6	12.2	1.5
	Bw1	3 to 9	3.0	0.3	0.1	0.4	14.4	26.4	1.29	0.042	31	6.0	2.5	1.4
1581	Bw2	9 to 24	1.4	0.2	0.1	0.4	6.1	34.4	0.40	0.017	24	5.5	1.2	1.2
	Cr	24 to 38	0.9	0.2	0.1	0.2	7.6	18.4	0.17	0.013	13	4.9	0.8	0.9
DOME	A	0 to 7	2.1	0.3	0.1	0.5	21.0	14.3	3.13	0.116	27	5.6	5.6	2.1
	Bw1	7 to 16	0.5	0.1	0.1	0.4	12.2	9.0	1.13	0.044	26	5.5	3.1	1.6
1602	Bw2	16 to 31	0.3	0.1	0.1	0.2	9.2	7.6	0.67	0.020	34	5.3	2.3	1.9
	C	31 to 60	0.3	0.1	0.1	0.2	7.1	9.9	0.40	0.017	24	5.0	2.5	1.9
GERLE	A1	0 to 3	1.4	0.4	0.3	0.5	26.6	9.8	6.94	0.194	36	4.3	9.8	0.9
	A2	3 to 12	0.3	0.1	0.2	0.3	14.8	6.1	2.45	0.080	31	4.7	2.2	1.3
1608	Bw1	12 to 30	0.2	0.1	0.2	0.2	10.7	6.5	1.39	0.049	28	5.0	3.1	1.2
	Bw2	30 to 62	0.2	0.1	0.2	0.2	10.7	6.5	0.88	0.043	20	5.0	3.1	1.4
HANG-	A	0 to 7	2.5	5.0	0.5	0.4	15.4	54.5	5.62	0.237	24	5.0	9.6	-
TOWN	BA	7 to 21	0.5	0.2	0.3	0.3	11.7	11.1	2.82	0.092	31	4.8	8.1	-
	Bw1	21 to 36	0.1	0.1	0.3	0.2	7.1	9.9	1.55	0.052	30	4.8	3.2	-
1606	Bw2	36 to 58	0.2	0.1	0.3	0.2	5.5	14.5	0.85	0.040	21	4.9	2.6	-
	BC	58 to 64	0.2	0.1	0.3	0.2	4.0	20.0	0.82	0.034	24	4.7	2.4	-
HARTLESS	A	0 to 7	8.5	0.7	0.1	0.2	50.1	19.0	10.94	0.355	31	5.6	2.4	2.0
	BA	7 to 21	0.4	< 0.1	0.1	< 0.1	8.7	5.7	1.02	0.047	22	5.0	1.4	2.9
1606	Bw1	21 to 36	0.3	< 0.1	0.1	< 0.1	7.1	5.6	0.60	0.022	27	5.0	1.2	3.0
	Bw2	36 to 58	0.2	< 0.1	0.1	0.1	6.6	6.1	0.34	0.019	18	5.0	1.8	3.7
	BC	58 to 64	0.2	< 0.1	0.1	0.1	5.1	7.8	0.26	0.013	20	5.1	2.0	3.6
McCARTHY	A1	0 to 10	8.3	1.8	0.1	1.4	28.8	40.3	3.88	0.141	28	6.5	5.5	2.7
1578	A2	10 to 16	3.8	2.1	0.1	1.3	24.5	29.8	1.76	0.068	26	6.1	5.1	2.8
	Bw	16 to 34	3.6	2.3	0.1	1.3	24.0	30.4	1.23	0.050	25	5.9	5.8	3.0

TABLE 9 - CHEMICAL DATA FOR SELECTED SOILS (CONT'D)

Series and Laboratory Number	Horizon	Depth	EXTRACTABLE BASES (milliequivalents per 100 grams of soil)				CATION EXCHANGE CAPACITY	BASE SATURATION	ORGANIC MATTER					
		IN.	CA	Mg	Na	K	meq/ 100gr	Pct	Organic Carbon Pct.	Organic Nitrogen Pct.	C/N	pH	P in ppm	Fe as Fe_2O_3 Pct.
McCARTHY	A1	0 to 9	9.5	0.1	0.1	0.7	37.9	27.4	6.56	0.239	27	6.0	17.7	1.7
1582	A2	9 to 15	1.8	0.1	0.1	0.5	33.0	7.6	3.86	0.169	24	5.5	10.6	1.7
	Bw	15 to 25	1.5	0.1	0.1	0.5	36.2	6.1	4.27	0.146	29	5.4	9.6	1.7
MIERUF	A	0 to 6	4.8	1.3	0.2	0.5	39.4	17.3	12.13	0.38	32	5.5	1.1	2.3
	BA	6 to 13	0.8	0.2	0.1	0.3	18.1	7.7	2.66	0.087	31	5.4	1.6	2.9
1605	Bw1	13 to 25	0.4	0.1	0.1	0.1	10.7	6.5	1.07	0.040	27	5.2	1.4	3.5
	Bw2	25 to 36	0.2	0.1	0.1	0.1	13.9	3.6	0.86	0.034	25	5.0	1.4	6.3
	Bw3	36 to 50	0.2	0.1	0.2	0.1	15.0	4.0	0.71	0.030	24	5.2	2.1	9.0
	Cr	50 to 61	0.1	0.1	0.1	0.1	15.1	2.6	0.77	0.030	26	5.0	2.9	9.1
NUENS	A1	0 to 3	8.0	1.2	0.2	0.5	34.2	28.9	11.54	0.333	35	5.5	3.2	2.6
	A2	3 to 12	1.1	0.2	0.1	0.2	14.9	10.7	2.87	0.086	33	5.2	1.6	-
	Bw1	12 to 23	0.3	0.1	0.1	0.1	8.7	6.9	1.01	0.033	31	4.6	1.4	2.6
	Bw2	23 to 34	0.2	0.1	0.1	0.1	9.2	5.4	1.12	0.031	36	4.8	1.2	2.5
NOTNED	A1	0 to 4	5.4	0.3	0.4	0.5	20.5	32.2	4.74	0.141	34	5.3	56.6	-
	A2	4 to 16	3.2	0.8	0.5	0.4	16.3	30.1	3.94	0.116	34	5.4	45.7	-
1531	Bw	16 to 35	2.0	0.2	0.6	0.4	14.3	22.4	2.59	0.065	40	5.3	33.6	-
	BC	35 to 46	1.3	0.3	0.3	0.3	10.1	21.8	1.33	0.054	25	5.1	13.4	-
	C1	46 to 54	1.2	0.1	0.4	0.2	5.0	38.0	1.02	0.042	24	5.1	12.1	-
PILLIKEN	A1	0 to 8	5.1	0.6	0.2	0.4	15.4	40.9	3.61	0.107	34	7.0	21.3	-
	A2	8 to 16	1.7	0.2	0.2	0.3	8.7	27.6	0.83	0.032	26	6.7	11.9	-
1590	AC	16 to 25	1.5	0.2	0.2	0.4	7.1	32.4	0.47	0.019	25	6.7	12.1	-
	C1	25 to 58	1.4	0.1	0.2	0.4	5.1	41.2	0.22	0.012	18	6.3	7.3	-
SITES	A	0 to 3	8.4	1.3	0.2	0.7	30.0	35.3	4.73	0.171	28	5.7	2.7	5.6
	BA	3 to 12	5.1	1.0	0.3	0.4	23.3	29.2	2.30	0.087	26	5.4	2.5	9.6
1574	Bt1	12 to 23	4.2	0.9	0.3	0.3	18.2	31.3	0.95	0.041	23	5.4	2.7	10.2
	Bt2	23 to 44	2.8	1.8	0.3	0.2	17.2	29.6	0.37	0.025	15	4.7	2.7	11.0
	Bt3	44 to 60	0.7	0.6	0.3	0.2	16.1	11.2	0.22	0.015	15	4.4	2.9	10.7
ZEIBRIGHT	A	0 to 10	7.7	0.5	0.1	0.6	19.3	46.1	2.98	0.092	32	6.6	14.4	0.8
	AC	10 to 21	3.6	0.3	0.1	0.6	11.7	39.3	1.26	0.064	20	6.2	6.8	1.0
1603	C1	21 to 35	1.3	0.2	0.1	0.5	7.2	29.2	0.38	0.023	17	6.0	2.9	1.0
	C2	35 to 42	1.3	0.2	0.1	0.7	8.3	27.7	0.34	0.019	18	5.7	2.9	1.7
	C3	42 to 60	1.5	0.2	0.2	0.7	9.9	26.3	0.54	0.017	32	5.4	2.9	1.8

TABLE 10 - PHYSICAL DATA FOR SELECTED SOILS

Analysis by Soil Morphology Laboratory University of California Davis

SERIES AND LABORATORY NUMBER	HORIZON	DEPTH	PARTICLE - SIZE DISTRIBUTION									MOISTURE DISTRIBUTION			
			TOTAL				SAND					MOISTURE RETAINED			
			SAND	SILT	CLAY		VERY COARSE	COARSE	MEDIUM	FINE	VERY FINE	AIR DRY	1/3 ATM.	15 ATM.	AVAILABLE MOISTURE 1/3 TO 15 ATM.
			2.0 mm To 0.05 mm	0.05 mm To 0.002 mm	< 0.002 mm	< 0.001 mm	2.0 mm To 1.0 mm	1.0 mm To 0.5 mm	0.5 mm To 0.25 mm	0.25 mm To 0.10 mm	0.10 mm To 0.05 mm				
		IN.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.
Bighill	A1	0 to 5	69.1	20.0	10.9	8.3	7.4	18.5	14.8	18.7	9.7	2.6	19.1	10.1	9.1
	A2	5 to 17	70.5	16.2	13.3	10.5	5.5	16.8	16.2	21.0	11.0	2.4	16.4	8.9	7.5
1579	Bw	17 to 32	69.2	15.5	15.3	12.9	4.8	17.0	16.1	21.2	10.1	1.8	12.9	8.3	4.6
	Cr	32 to 39	74.8	13.4	11.8	9.6	5.8	19.3	17.4	21.8	10.5	1.8	10.1	6.6	3.5
Chaix	A	0 to 3	66.1	26.2	7.7	4.9	15.0	21.6	8.7	11.7	9.1	3.5	26.5	7.8	18.7
	Bw1	3 to 9	70.3	22.1	7.6	4.8	16.1	24.5	9.6	11.6	8.5	2.9	18.9	7.4	11.5
1581	Bw2	9 to 24	68.9	23.3	7.9	5.8	12.7	24.3	10.1	12.5	9.3	1.5	14.5	5.5	9.0
	Cr	24 to 38	65.7	26.1	8.2	6.3	11.9	23.6	8.7	12..2	9.3	1.3	20.8	6.0	14.8
Dome	A	0 to 7	74.2	20.6	5.2	3.1	19.2	17.4	11.3	16.4	9.7	11.7	12.9	8.3	8.6
	Bw1	7 to 16	75.8	18.7	5.5	3.4	17.4	18.7	11.9	17.7	10.1	6.7	12.5	6.1	6.4
1602	Bw2	16 to 31	75.5	17.8	6.7	4.4	15.9	18.0	12.3	18.6	10.7	3.6	11.9	4.4	7.5
	C	31 to 60	73.7	18.4	7.9	5.2	14.5	17.6	12.0	18.9	10.7	2.5	13.0	5.4	7.6
Gerle	A1	0 to 3	72.9	21.2	5.9	4.1	10.8	14.2	13.4	22.0	12.5	2.5	26.5	12.3	14.2
	A2	3 to 12	78.0	17.5	4.5	2.7	11.8	15.9	13.3	21.8	15.2	2.2	15.0	7.3	7.7
1608	Bw1	12 to 30	76.1	20.3	4.6	2.1	10.4	16.6	13.8	22.9	14.4	2.1	14.1	5.6	8.5
	Bw2	30 to 62	76.7	19.7	3.6	2.1	8.8	16.5	14.7	22.0	14.7	1.9	11.2	5.4	5.8
Hangtown	A	0 to 3	68.1	24.8	7.1	5.9	5.5	7.7	9.2	29.0	16.7	2.5	18.6	12.4	6.2
	Bw1	3 to 10	74.0	18.6	7.4	6.2	7.2	7.6	9.8	30.9	18.5	1.5	10.9	6.6	4.3
1532	Bw2	10 to 24	72.1	19.3	8.6	7.5	6.4	7.1	10.0	29.8	18.8	1.1	10.1	5.3	4.8
	C1	24 to 35	69.6	19.0	11.4	9.6	5.3	7.9	10.9	29.3	16.2	0.9	10.8	5.4	5.4
	C2	35 to 46	71.2	17.4	11.4	9.8	4.6	6.7	10.9	33.0	16.0	1.0	9.9	5.3	4.6
Hartless	A	0 to 7	51.3	35.6	13.1	10.5	6.0	7.7	7.7	16.3	13.6	7.8	41.7	17.7	24.0
	BA	7 to 21	58.4	27.9	13.7	11.0	5.6	7.7	8.7	18.5	17.9	1.9	19.5	8.6	10.9
1606	Bw1	21 to 36	61.8	25.1	13.1	11.1	6.2	10.0	10.3	19.3	16.0	1.7	16.7	8.1	8.6
	Bw2	36 to 58	63.6	21.6	14.8	12.8	9.7	9.6	9.4	18.0	16.9	2.1	15.3	8.3	7.0
	BC	58 to 64	60.4	27.4	12.2	10.6	6.5	8.2	7.7	18.6	19.4	2.5	16.3	8.0	8.3
Mccarthy	A1	0 to 10	63.2	24.7	12.1	7.4	22.8	14.5	7.2	10.9	7.8	6.7	36.9	20.5	16.4
	A2	10 to 16	64.5	23.1	12.4	7.9	22.7	15.0	7.8	11.7	7.3	6.6	33.2	20.9	12.3
1578	Bw	16 to 34	62.4	23.4	14.2	9.9	20.3	14.5	7.8	11.7	8.1	6.7	33.6	21.7	11.9

TABLE 10 - PHYSICAL DATA FOR SELECTED SOILS (CONT'D)

SERIES AND LABORATORY NUMBER	HORIZON	DEPTH	PARTICLE - SIZE DISTRIBUTION: TOTAL: SAND 2.0 mm To 0.05 mm	TOTAL: SILT 0.05 mm To 0.002 mm	TOTAL: CLAY < 0.002 mm	TOTAL: CLAY < 0.001 mm	SAND: VERY COARSE 2.0 mm To 1.0 mm	SAND: COARSE 1.0 mm To 0.5 mm	SAND: MEDIUM 0.5 mm To 0.25 mm	SAND: FINE 0.25 mm To 0.10 mm	SAND: VERY FINE 0.10 mm To 0.05 mm	MOISTURE DISTRIBUTION: MOISTURE RETAINED: AIR DRY	1/3 ATM.	15 ATM.	AVAILABLE MOISTURE 1/3 TO 15 ATM.
		IN.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.	PCT.
McCarthy	A1	0 to 9	65.5	25.6	8.9	5.5	22.4	12.5	7.8	12.9	9.9	6.7	39.5	18.0	21.5
	A2	9 to 15	66.8	25.6	7.6	4.3	19.3	13.2	8.4	14.7	11.2	6.3	33.9	17.6	16.3
1582	Bw	15 to 25	67.3	24.5	8.2	4.9	19.2	13.8	8.5	14.7	11.1	6.5	33.6	17.8	15.8
Mieruf	A	0 to 6	37.2	52.9	9.9	7.4	5.1	4.7	4.1	9.8	13.5	6.6	43.8	20.4	23.4
	BA	6 to 13	37.7	52.1	10.2	7.6	5.9	4.4	3.4	10.1	13.9	3.2	26.1	10.7	15.4
1605	Bw1	13 to 25	35.5	51.9	12.6	9.7	5.1	4.5	3.0	9.0	13.9	2.1	22.5	9.3	13.2
	Bw2	25 to 36	24.9	60.8	14.3	10.2	2.5	2.9	2.1	6.4	11.0	2.7	31.8	12.3	
	Bw3	36 to 50	21.1	64.8	14.1	9.5	1.7	2.0	1.5	4.4	11.5	3.3	39.2	13.4	
	Cr	50 to 61	27.4	59.8	12.8	8.8	2.7	3.4	2.2	5.9	13.2	3.9	33.8	12.9	
Neuns	A1	0 to 3	41.4	50.2	8.4	6.9	3.4	2.8	3.1	16.4	15.7	6.8	37.4	19.2	18.2
	A2	3 to 12	53.2	38.8	8.0	7.0	5.2	5.3	4.4	19.1	19.2	2.7	22.1	9.3	12.8
1607	Bw1	12 to 23	55.6	32.6	11.8	10.3	4.9	5.2	5.4	20.3	19.8	2.1	19.3	8.3	11.0
	Bw2	23 to 34	51.7	34.1	14.2	12.6	3.4	4.9	5.4	19.5	18.5	1.7	19.8	9.4	10.4
Notned	A1	0 to 4	80.1	14.1	5.8	4.3	23.2	20.2	11.4	17.2	8.0	2.5	16.9	8.6	8.3
	A2	4 to 16	83.1	11.1	5.8	4.1	24.7	22.3	11.7	15.8	8.6	2.0	12.7	6.8	5.9
1531	Bw	16 to 35	81.0	12.8	6.2	4.5	20.3	20.7	12.2	18.9	8.9	1.9	10.6	6.0	4.6
	BC	35 to 46	83.4	10.8	5.8	4.6	17.6	20.6	14.5	21.9	8.8	1.5	9.1	4.1	5.0
	C1	46 to 54	86.7	8.0	5.3	3.6	21.8	23.4	14.3	20.0	7.2	1.0	7.5	3.4	4.1
Pilliken	A1	0 to 8	81.9	12.8	5.3	3.6	20.7	19.1	10.9	20.1	11.1	1.7	12.9	6.2	6.7
	A2	8 to 16	83.7	12.7	3.6	2.8	21.8	19.6	11.0	20.5	10.8	1.2	10.9	4.3	6.6
1590	AC	16 to 25	86.0	10.2	3.8	3.1	19.3	18.7	11.8	23.2	13.0	1.1	9.2	4.0	5.2
	C1	25 to 58	83.9	11.1	5.0	4.0	18.8	16.9	10.6	23.8	13.8	0.9	9.2	4.0	5.2
Sites	A	0 to 3	25.1	52.0	22.9	16.6	2.3	3.1	2.5	5.8	11.4	3.6	39.7	21.7	18.0
	BA	3 to 12	25.7	42.1	32.2	25.1	4.4	3.7	3.3	6.5	7.8	3.5	35.0	23.6	11.4
1574	Bt1	12 to 23	20.9	35.0	44.1	37.3	2.0	2.8	2.7	6.1	7.3	3.2	33.3	23.5	9.8
	Bt2	23 to 44	16.1	31.3	52.6	47.5	1.3	2.0	2.1	5.1	5.6	3.2	33.0	25.4	7.6
	Bt3	44 to 60	23.1	34.3	42.6	38.1	2.1	2.7	3.3	7.4	7.6	2.7	31.4	22.0	9.4
Zeibright	A	0 to 10	70.9	23.8	5.3	3.5	17.6	18.6	12.0	12.8	9.9	9.2	20.3	10.1	10.2
	AC	10 to 21	79.3	14.6	6.1	4.4	19.1	19.7	12.5	18.7	9.1	7.3	12.3	6.5	5.8
1603	C1	21 to 35	79.3	15.2	5.5	4.0	12.9	20.0	13.8	21.8	10.8	2.9	10.7	4.5	6.2
	C2	35 to 42	73.9	16.9	9.2	7.0	16.7	17.8	11.8	17.8	9.8	4.8	14.7	7.1	7.6
	C3	42 to 60	72.2	15.1	12.7	9.8	13.3	18.1	12.3	18.2	10.3	5.3	16.2	8.5	7.7

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(1) mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;

(2) fax: (202) 690-7442; or

(3) email: program.intake@usda.gov.

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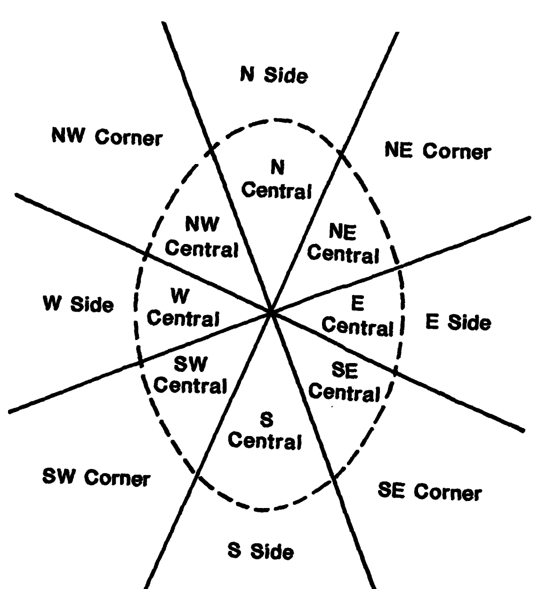
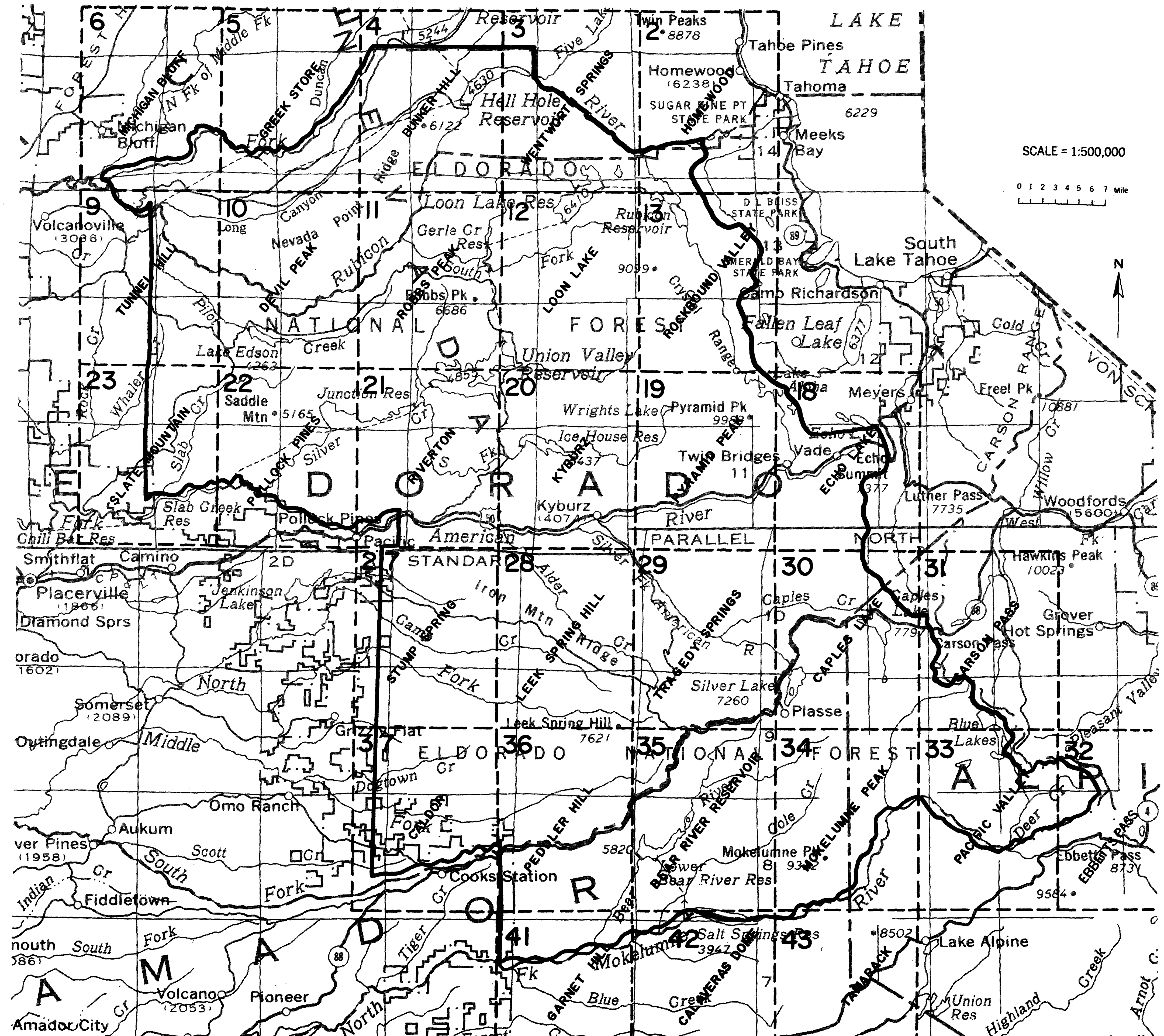
INDEX TO MAP SHEETS
ELDORADO NATIONAL FOREST AREA

LOCATION OF PROFILES REPRESENTATIVE OF SOIL SERIES

SERIES	MAP SHEET	LOCATION
Aiken	9	N.E. Corner
Andic Cryumbrepts	29	N.E. Corner
Aquets	28	S.E. Corner
Big Hill	9	S. Side
Chaix	20	S. Side
Cohasset	22	S.E. Corner
Crozier	22	S.E. Corner
Cryumbrepts	34	N.W. Central
Dome	20	N.W. Corner
Dome Variant	20	N.W. Corner
Fluvents	10	S.E. Corner
Gerle	11	N.E. Corner
Hangtown	3	S.W. Side
Hartless	11	S. Side
Hartless Variant	20	N. Side
Holland	21	S. Side
Jocal	22	N. Side
Ledford	3	W. Side
Ledmount	21	S.W. Central
Lithic Cryumbrepts	19	S. Side
Lithic Xerumbrepts	19	S.E. Corner
Lumberly	36	S.W. Central
Mariposa	23	E. Side
Maymen	23	E. Side
McCarthy	28	W. Side
Mieruf	11	S. Central
Musick	23	N.E. Corner
Neuns	11	S. Central
Notned	18	S.W. Side
Orthents	34	S.W. Side
Pilliken	20	S.E. Corner
Sites	23	N. Side
Smokey	11	E. Side
Tallac	4	S.E. Side
Tallac Variant	3	W. Side
Umbrepts	20	N.W. Corner
Waca	29	N.E. Corner
Windy	28	S.E. Corner
Xerumbrepts	29	E. Central
Zeibright	20	N.W. Corner

Index to Location of Profiles



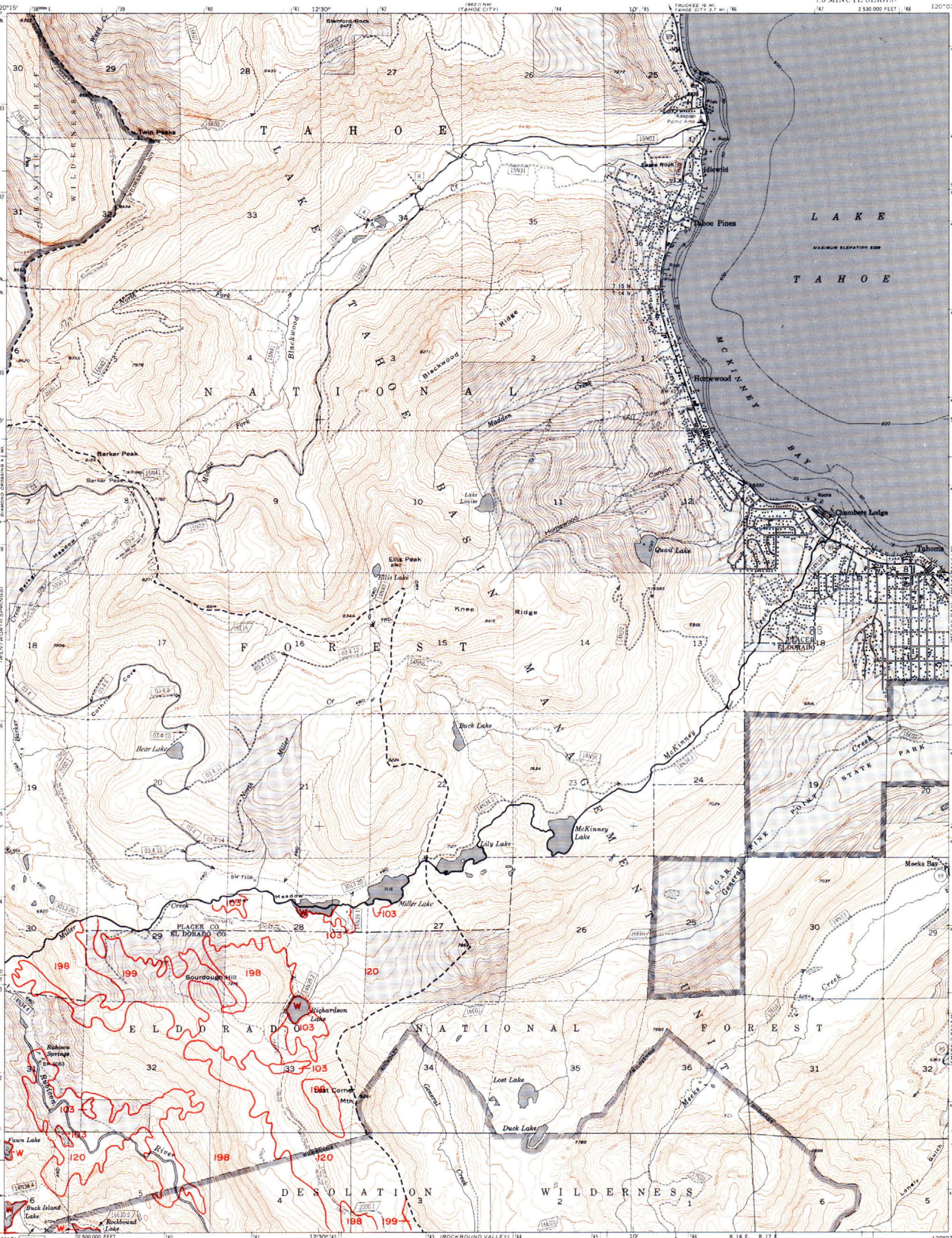


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 2

HOMEWOOD QUADRANGLE
PLACER AND EL DORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1955

Photorevised 1969

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road
- Gravel Road (Improved Light Duty)
- Dirt Road (Improved Light Duty)
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

LAKE TAHOE BASIN MANAGEMENT UNIT

HOMEWOOD, CALIFORNIA
N3900—W12007.5/7.5

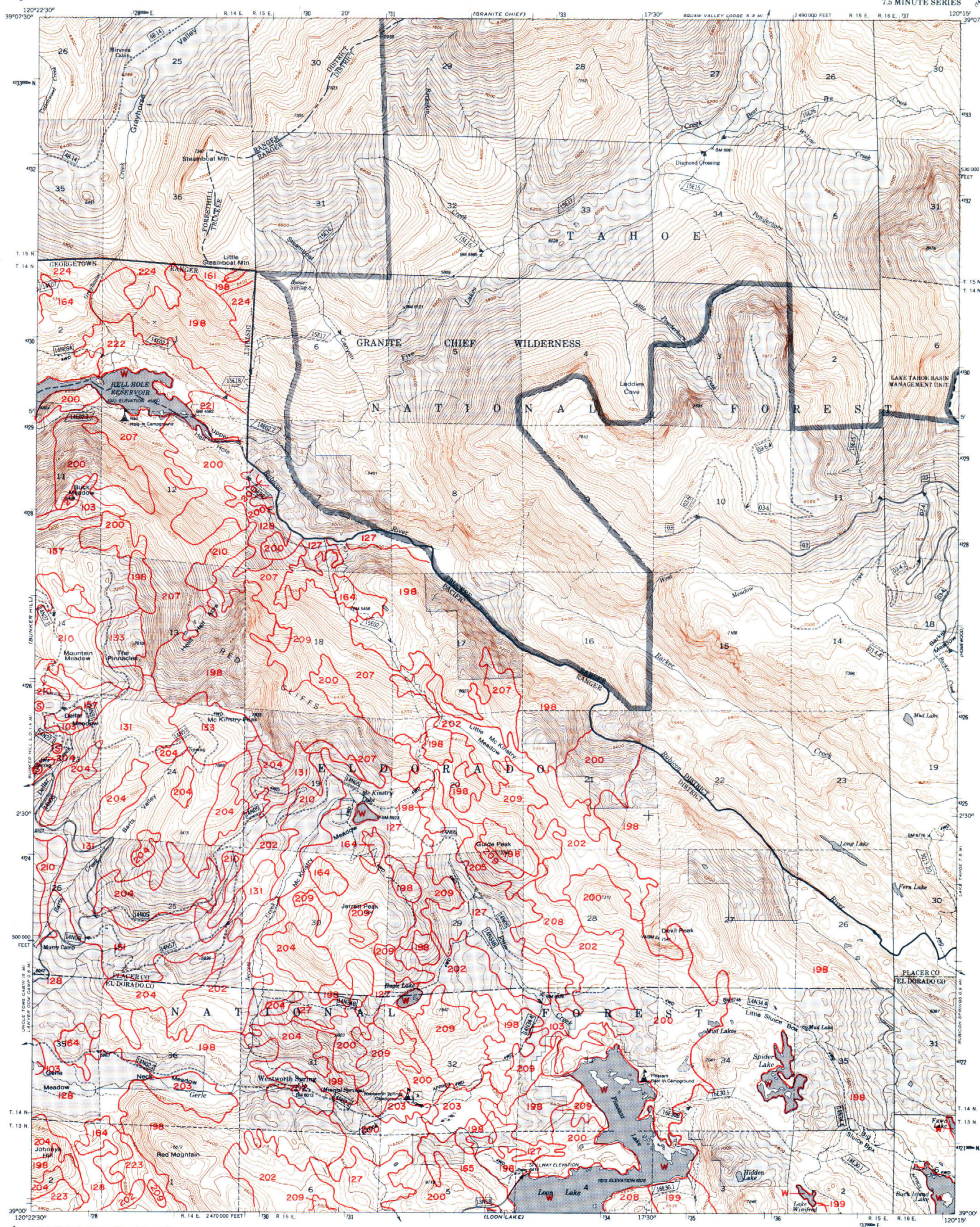
538-3C

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 3
WENTWORTH SPRINGS QUADRANGLE
PLACER-ELDORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



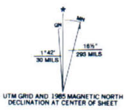
BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1953

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region



UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

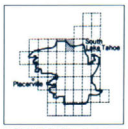
LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
(Improved Light Duty)
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction



ELDORADO NATIONAL FOREST

WENTWORTH SPRINGS, CALIFORNIA
N3900-W12015/7.5
(539-4C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
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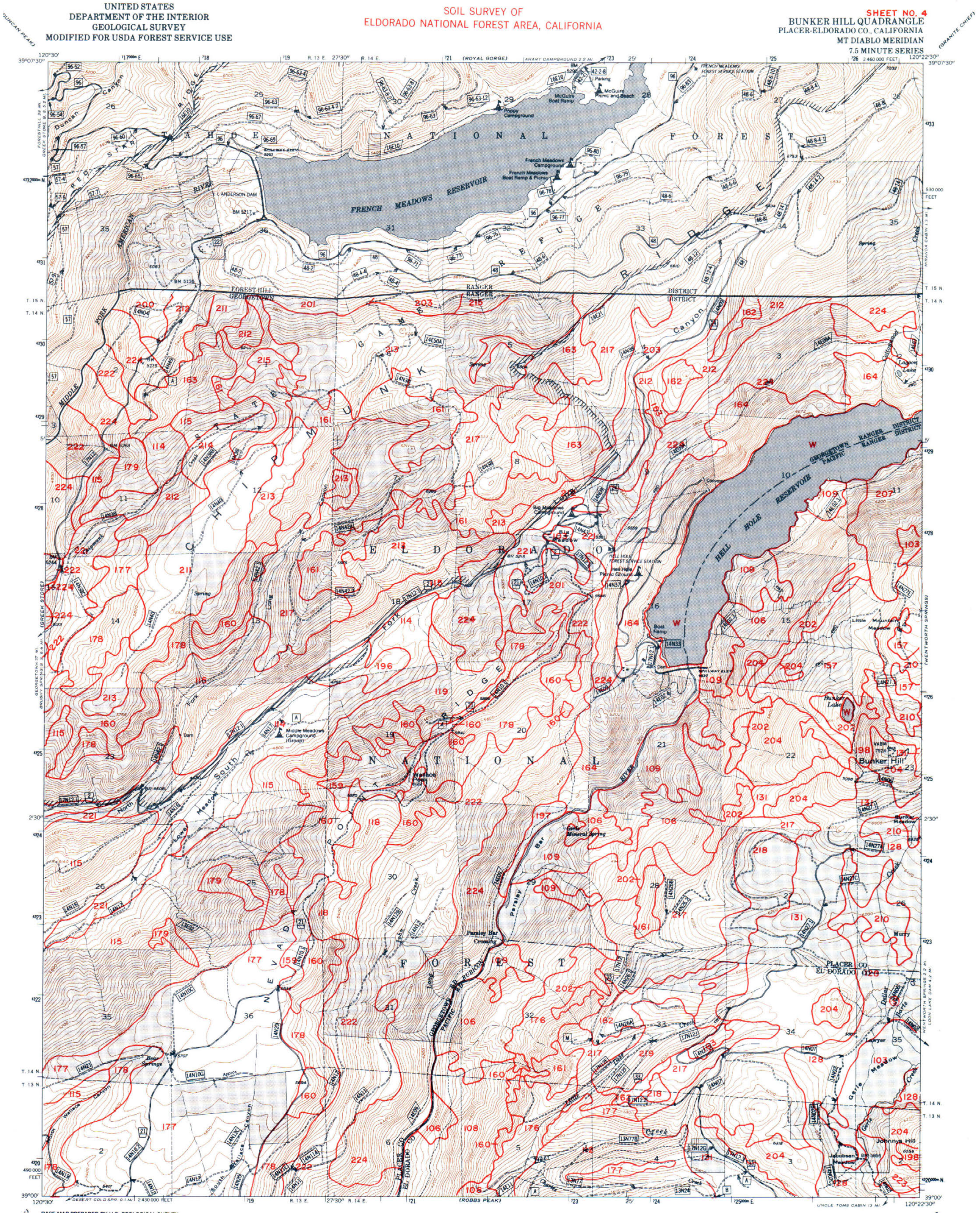
SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 4
BUNKER HILL QUADRANGLE
PLACER-ELDORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1953

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

BUNKER HILL, CALIFORNIA
N3900-W12022.5/7.5
(539-3C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

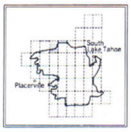
SHEET NO. 5
GREEK STORE QUADRANGLE
PLACER CO.
MT DIABLO MERIDIAN

National Geodetic Vertical Datum of 1929
Polyconic Projection—1927 North American datum

10,000 foot grid based California coordinate system, zone 2. 1,000 meter Universal Transverse Mercator grid ticks, zone 10.

MAPPED, EDITED AND PUBLISHED BY THE
U.S. GEOLOGICAL SURVEY, 1952
Photorevised, 1973

Prepared by the U.S. Forest Service Geometronics Service Center, Salt Lake City utilizing 1976 field checked compilation guides. Revised information added using photogrammetric methods from compilation completed in Reston, Virginia.



QUADRANGLE LOCATION DIAGRAM

1 MILE
7000 FEET
1 KILOMETER

LEGEND

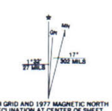
- Heavy Duty Road
- Medium Duty Road
- Improved Road
- Unimproved Road
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- U.S. or State Highway
- Forest Road or Trail
- Alienated Land within the National Forest Boundaries as of January, 1977
- National Forest Boundary
- Management Unit Boundary
- Ranger District Boundary
- District Ranger Station

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

540-2C	540-1C	539-2C
540-3C	540-4C	539-3C
525-2C	525-1C	524-2C

ADJACENT QUADRANGLES
Indicated by Forest Service Number



UTM GRID AND 1977 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

PRIMARY BASE SERIES MAP

GREEK STORE, CALIFORNIA

N3900–W12030/7.5

540-4C

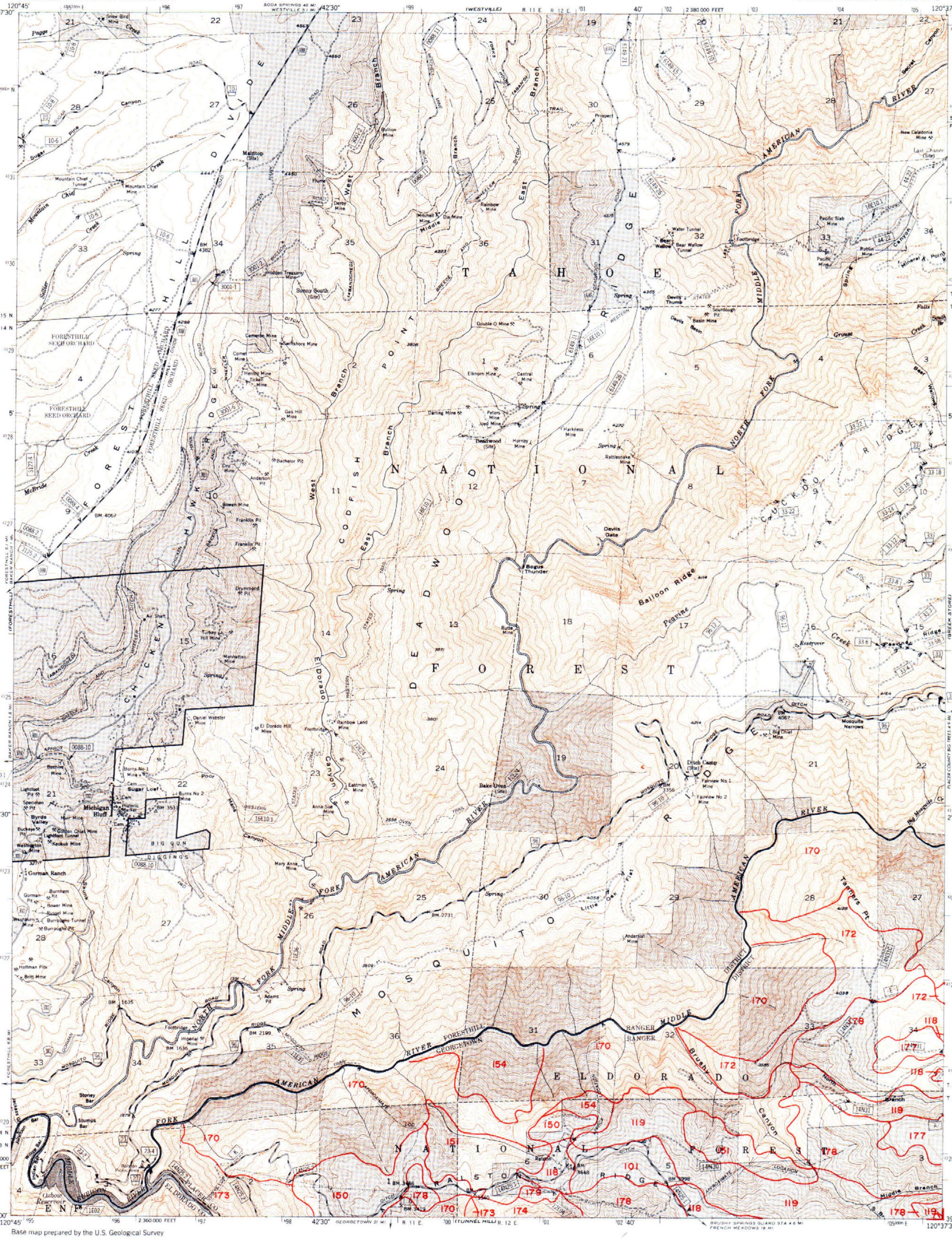
1978

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 6

MICHIGAN BLUFF QUADRANGLE
CALIFORNIA AND PLACER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Base map prepared by the U.S. Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1952. Field check 1976

Polyconic projection. 1927 North American datum 10,000-foot grid based on California coordinate system, zone 2

1,000-meter Universal Transverse Mercator grid ticks, zone 10

Modification to the USGS base map by the Geometronics Service Center from 1984 aerial photography and 1986 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

- Primary Highway
- Secondary Highway
- Improved Road, Paved
- Improved Road, Gravel
- Improved Road, Dirt
- Unimproved Road, Dirt
- Trail
- Road, Location Approximate

- Interstate
- U.S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail
- Trail, Location Approximate

ADJACENT QUADRANGLES
Indicated by Forest Service Number

MICHIGAN BLUFF, CALIF.
N3900—W12037.5/7.5
1978

540-3C

REVISED 1986

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 9

TUNNEL HILL QUADRANGLE
ELDORADO-PLACER CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES

BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1950

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road (Improved Light Duty)
- Gravel Road (Improved Light Duty)
- Dirt Road (Improved Light Duty)
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

TUNNEL HILL, CALIFORNIA
N3852.5-W12037.5/7.5
(525-2C)

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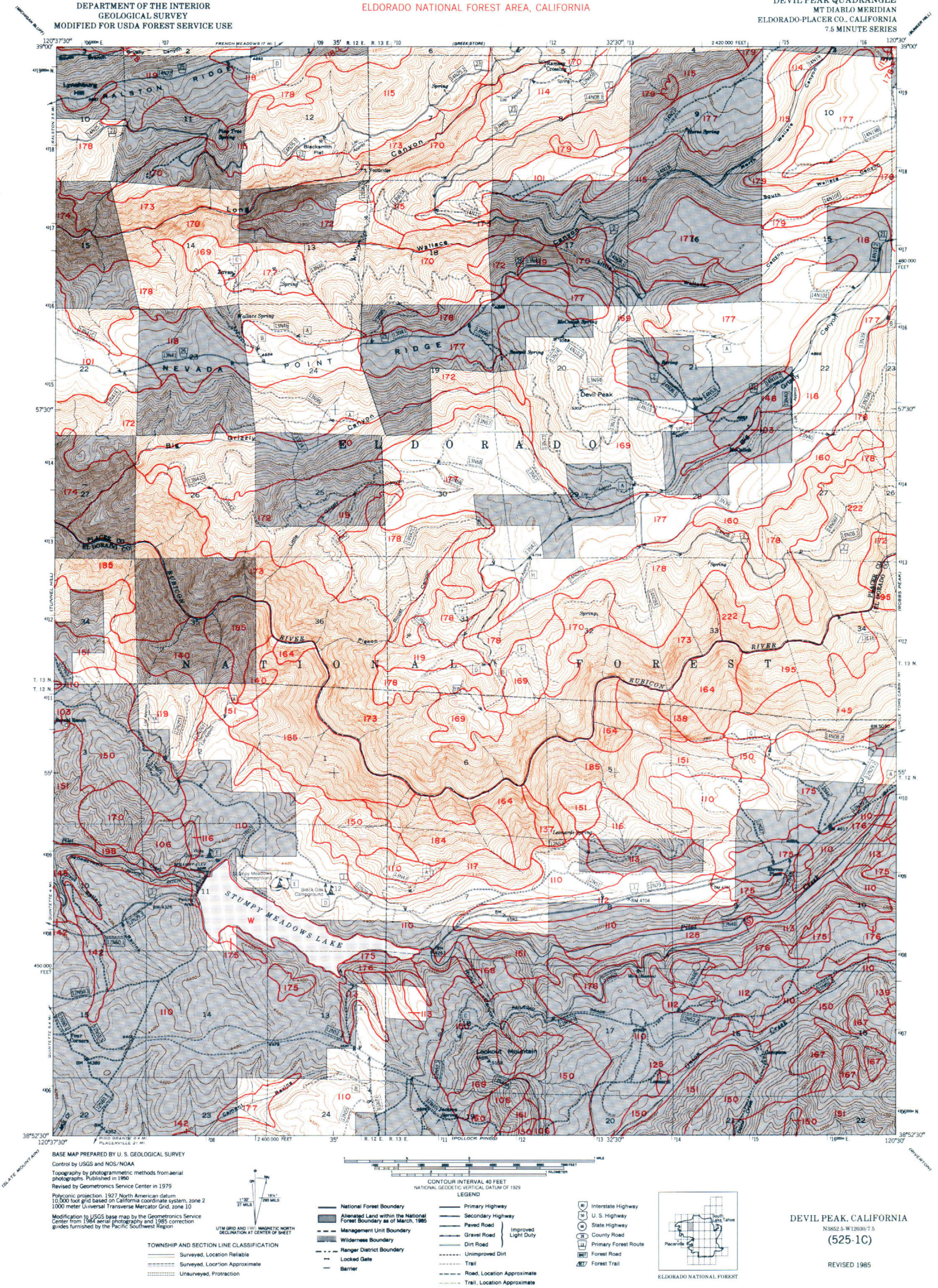
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

DEVIL PEAK QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO-PLACER CO., CALIFORNIA
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1950

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

DEVIL PEAK, CALIFORNIA
N3852.5-W12030/7.5
(525-1C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 11
ROBBS PEAK QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO-PLACER CO., CALIFORNIA
7.5 MINUTE SERIES

BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1950

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road (Improved Light Duty)
- Gravel Road (Improved Light Duty)
- Dirt Road (Improved Light Duty)
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

ROBBS PEAK, CALIFORNIA
N3852.5-W12022.5/7.5
(524-2C)

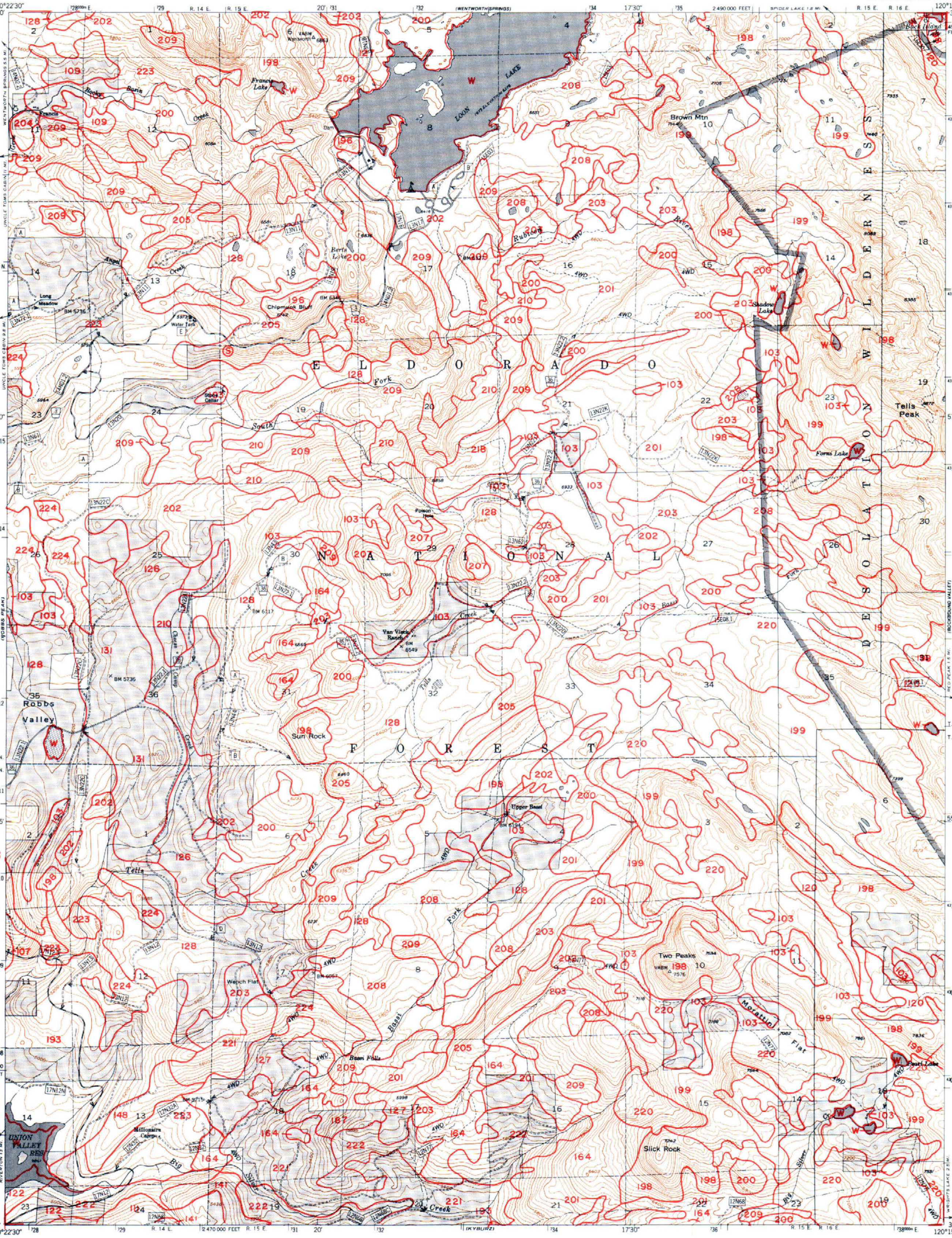
REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 12

LOON LAKE QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO CO., CALIFORNIA
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1952

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

LOON LAKE, CALIFORNIA
N3852.5-W12015/7.5
(524-1C)

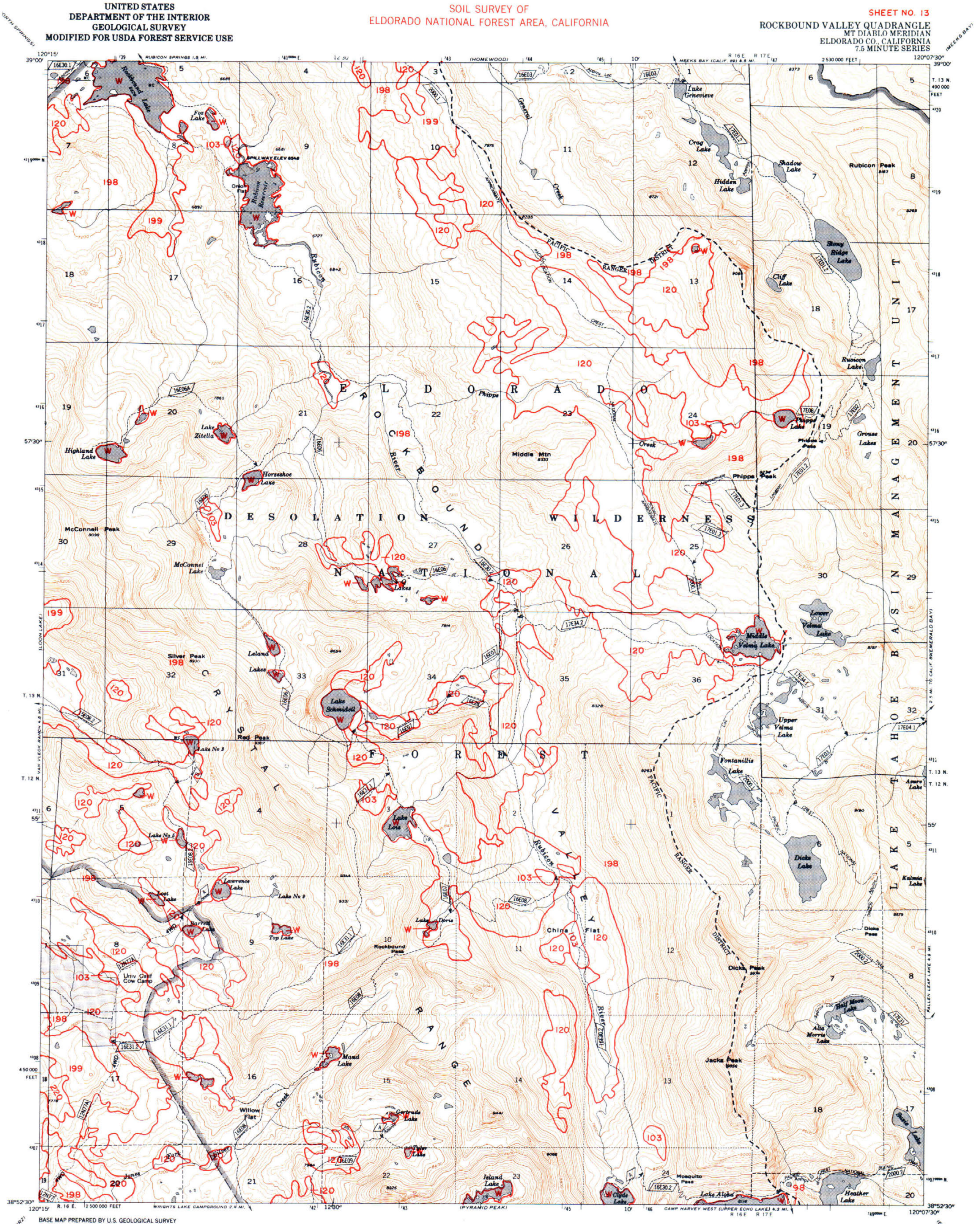
REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 13

ROCKBOUND VALLEY QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO CO., CALIFORNIA
7.5 MINUTE SERIES



BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1955

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

GN MN
1°46' 31 MILS
16½° 293 MILS

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

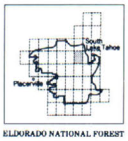
LEGEND

TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier

- Primary Highway
- Secondary Highway
- Paved Road
- Gravel Road
- Dirt Road
(Improved Light Duty)
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate

- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail



ELDORADO NATIONAL FOREST

ROCKBOUND VALLEY, CALIFORNIA
N3852.5-W12007.5/7.5
(523-2C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 18
ECHO LAKE QUADRANGLE
EL DORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES

BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1955
Photorevised 1969

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

LAKE TAHOE BASIN MANAGEMENT UNIT

ECHO LAKE, CALIFORNIA
N3845—W12000/7.5

523-4C

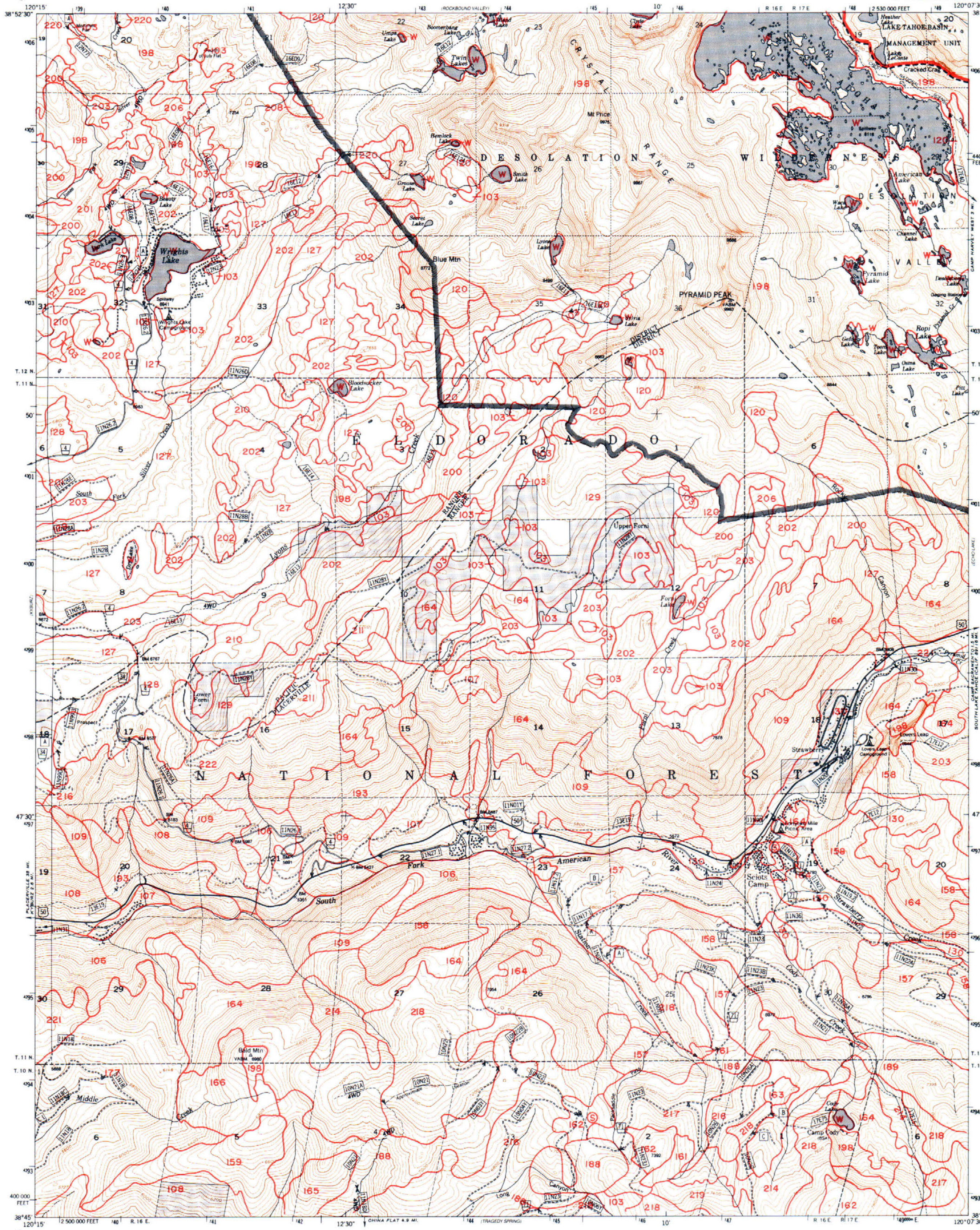
REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 19

PYRAMID PEAK QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO CO., CALIFORNIA
7.5 MINUTE SERIES



BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1955

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

ELDORADO NATIONAL FOREST

PYRAMID PEAK, CALIFORNIA
N3845-W12007.5/7.5
(523-3C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 20
KYBURZ QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO CO., CALIFORNIA
7.5 MINUTE SERIES

BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1952

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1°41' 30 MILS
16½° 293 MILS

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road — Improved Light Duty
Gravel Road — Improved Light Duty
Dirt Road — Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

South Lake Tahoe
Placerville
ELDORADO NATIONAL FOREST

KYBURZ, CALIFORNIA
N3845-W12015/7.5
(524-4C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 21
RIVERTON QUADRANGLE
ELDORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES

BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1950

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

1°38′ 29 MILS
16½° 293 MILS

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road, Gravel Road, Dirt Road — Improved Light Duty
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

RIVERTON, CALIFORNIA
N3845-W12022.5/7.5
(524-3C)

REVISED 1985

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SHEET NO. 22

POLLOCK PINES QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO CO., CALIFORNIA
7.5 MINUTE SERIES

BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1950

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road (Improved Light Duty)
- Gravel Road (Improved Light Duty)
- Dirt Road (Improved Light Duty)
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

POLLOCK PINES, CALIFORNIA
N3845-W12030/7.5
(525-4C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 23
SLATE MOUNTAIN QUADRANGLE
ELDORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES

BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1950

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

1°27′ 26 MILS
16½° 293 MILS

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

South Lake Tahoe
Placerville

ELDORADO NATIONAL FOREST

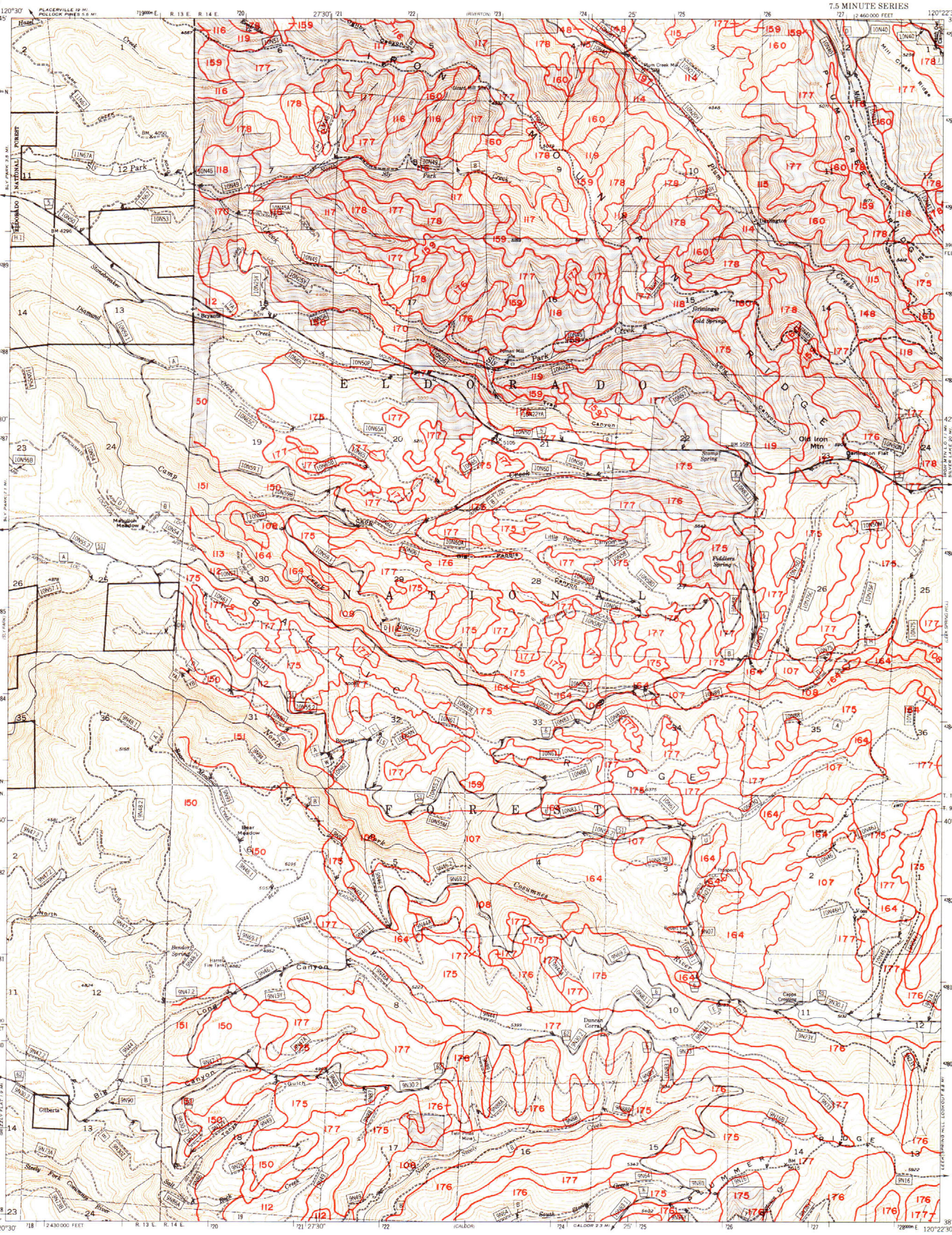
SLATE MOUNTAIN, CALIFORNIA
N3845-W12037.5/7.5
(525-3C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 27
STUMP SPRING QUADRANGLE
ELDORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1951

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

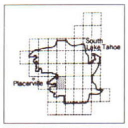
National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road — Improved Light Duty
Gravel Road — Improved Light Duty
Dirt Road — Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction



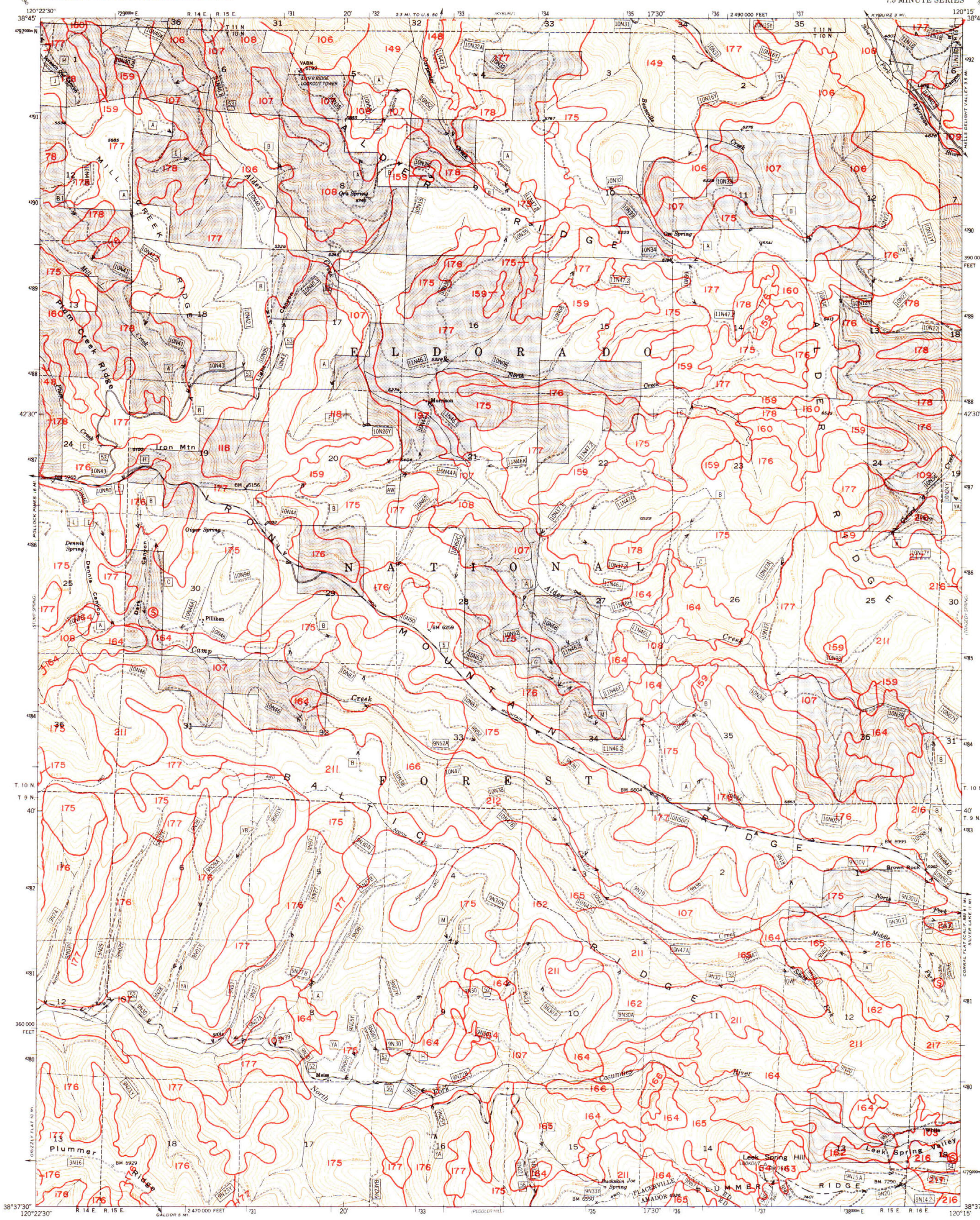
ELDORADO NATIONAL FOREST

STUMP SPRING, CALIFORNIA
N3837.5-W12022.5/7.5
(508-2C)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 28
LEEK SPRING HILL QUADRANGLE
MT DIABLO MERIDIAN
ELDORADO CO., CALIFORNIA
7.5 MINUTE SERIES



BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1951

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

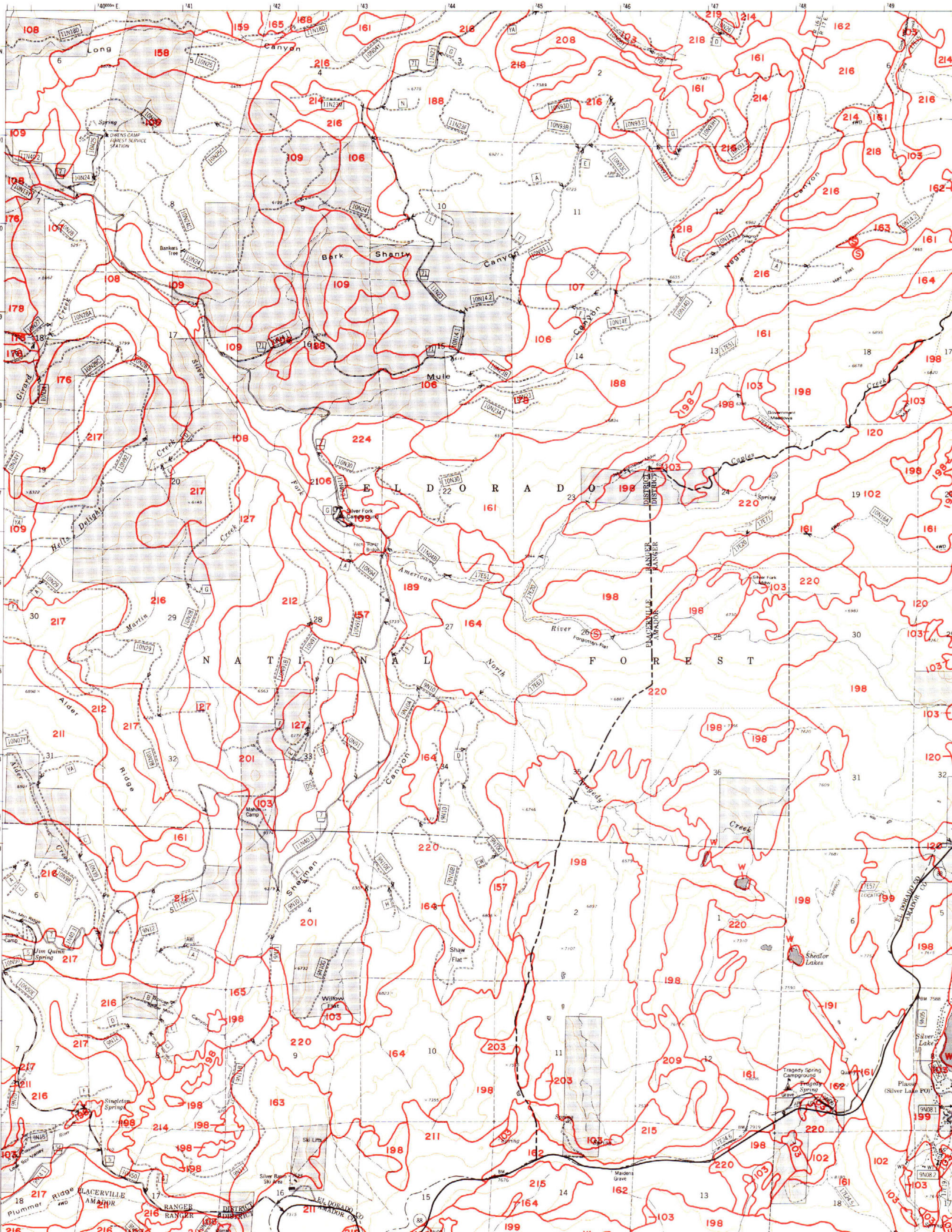
LEEK SPRING HILL, CALIFORNIA
N3837.5-W12015/7.5
(508-1C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 29
TRAGEDY SPRING QUADRANGLE
ELDORADO - AMADOR CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1979

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road — Improved Light Duty
Gravel Road — Improved Light Duty
Dirt Road
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

TRAGEDY SPRING, CALIFORNIA
N3837.5-W12007.5/7.5

(507-2C)

REVISED 1985

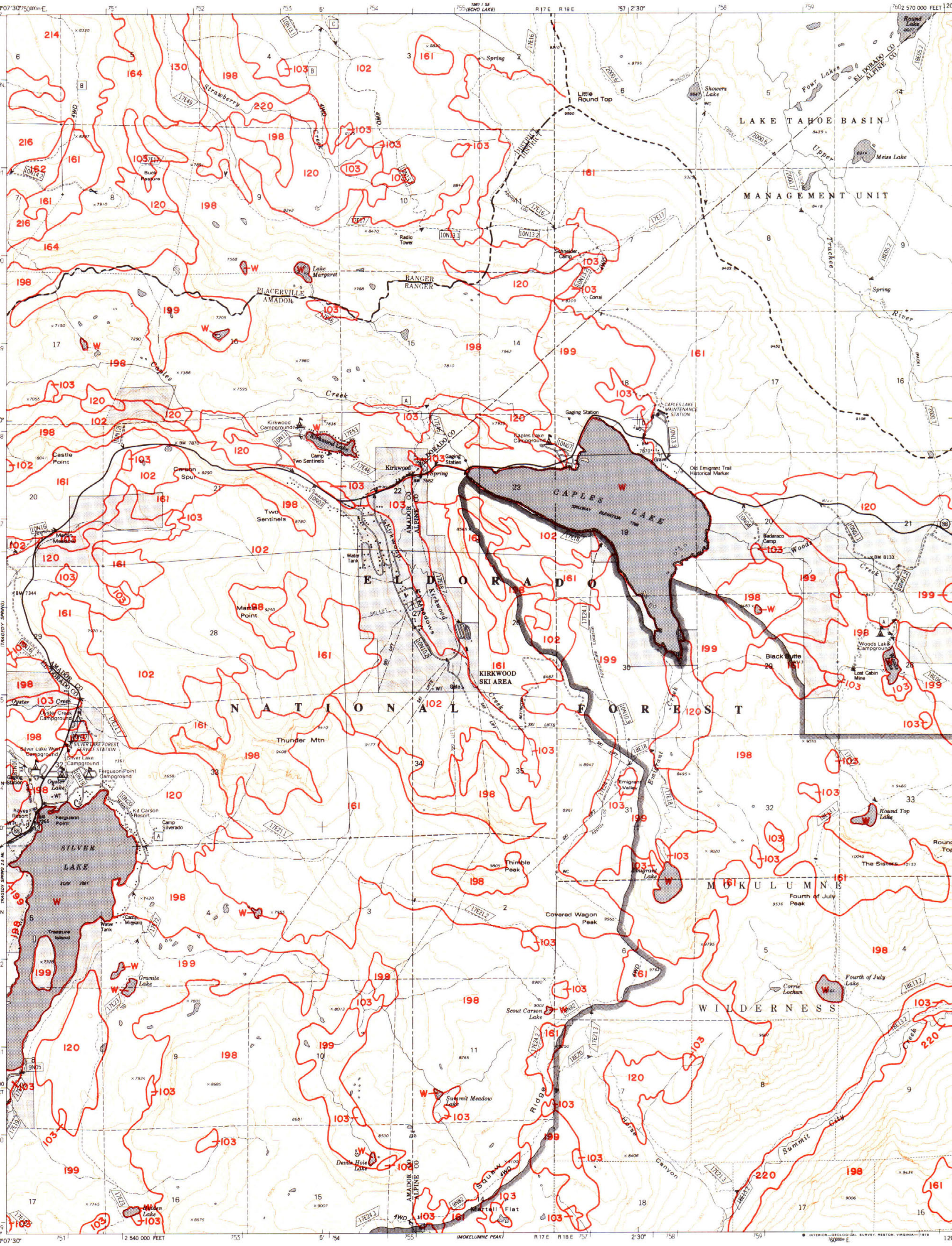
ELDORADO NATIONAL FOREST

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 30

CAPLES LAKE QUADRANGLE
MT DIABLO MERIDIAN
AMADOR - ELDORADO - ALPINE CO., CALIFORNIA
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs. Published in 1978
Revised by Geometronics Service Center in 1979
Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10
Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction data furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

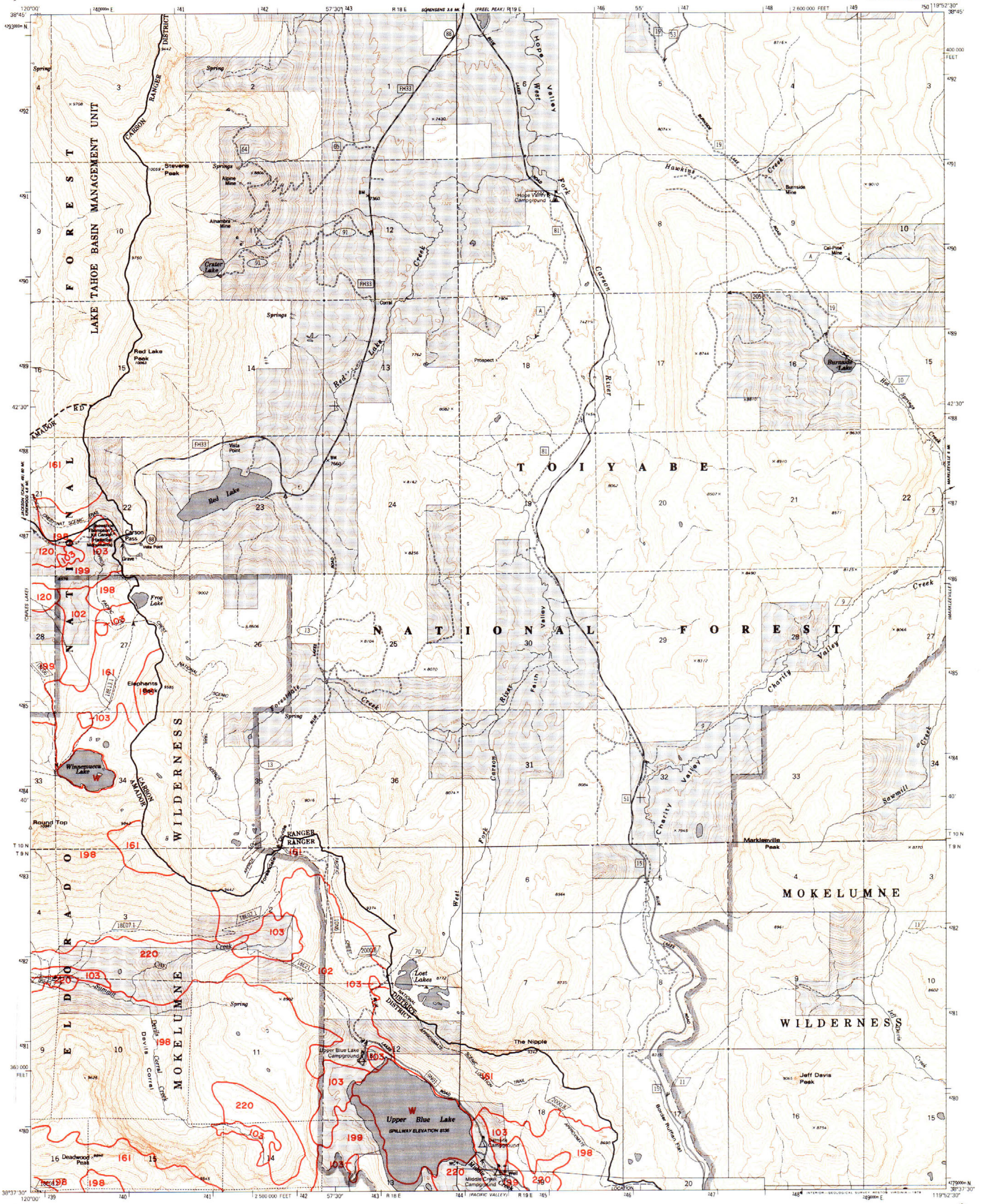
ELDORADO NATIONAL FOREST

CAPLES LAKE, CALIFORNIA
N3837.5-W12000/7.5
(507-1C)
REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 31
CARSON PASS QUADRANGLE
ALPINE CO. CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1979

Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
Improved Light Duty
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

CARSON PASS, CALIFORNIA
N3837.5-W11952.5
(506-2C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 32
EBBETTS PASS QUADRANGLE
CALIFORNIA–ALPINE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Base map prepared by the U.S. Geological Survey
Control by USGS, NOS/NOAA, and State of California
Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1974. Map edited 1979
Projection and 10,000-foot grid ticks: California coordinate system, zone 2 (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 11
1927 North American datum
To place on the predicted North American Datum 1983 move the projection lines 13 meters north and 87 meters east as shown by dashed corner ticks

Modification to USGS base map by the Geometronics Service Center from 1980 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of 1985
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Road, Dirt
Trail
Locked Gate

Interstate Highway
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

STANISLAUS NATIONAL FOREST

EBBETTS PASS, CALIF.
N3830–W11945/7.5
REVISED 1985

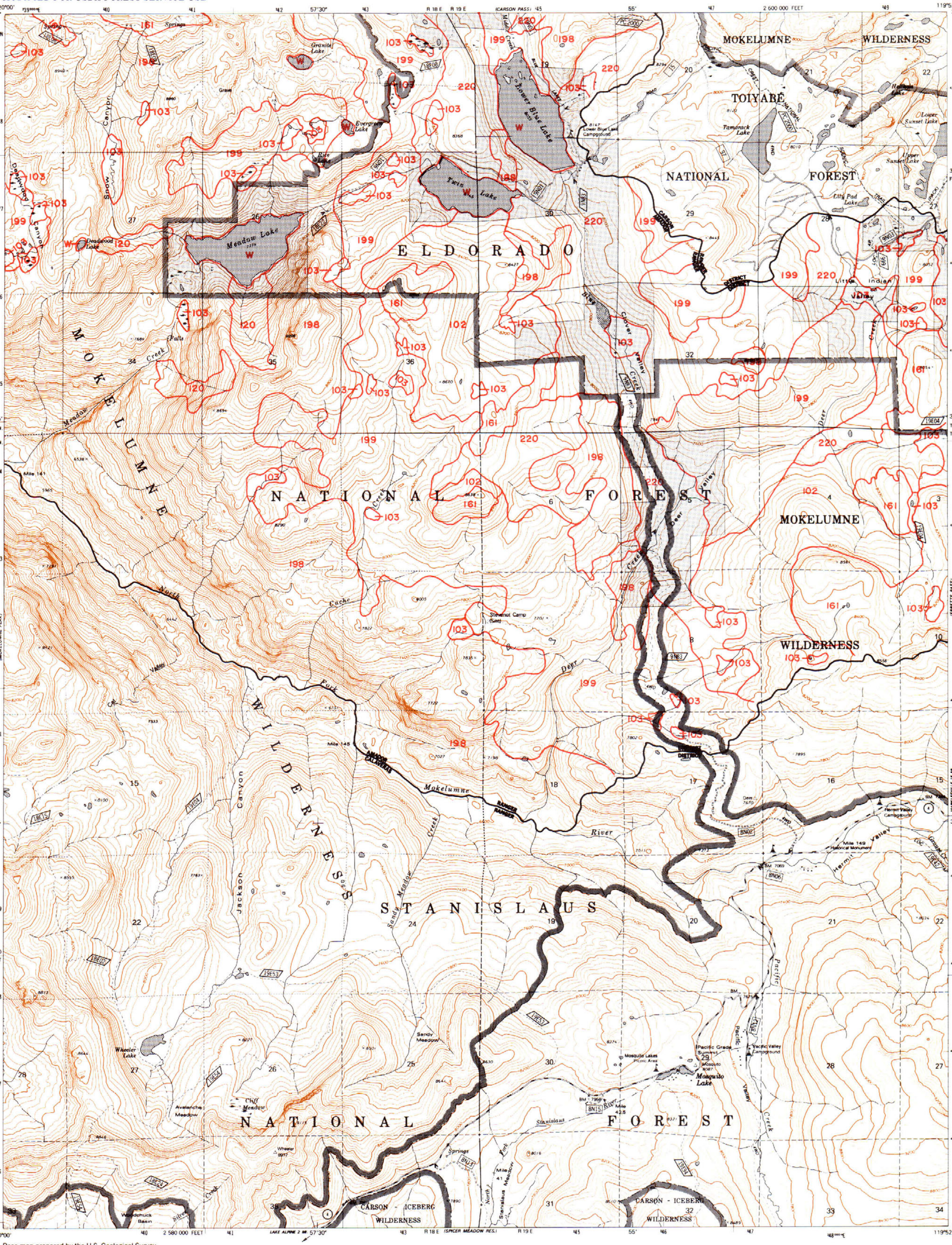
506-4C

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

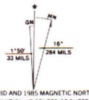
SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 33

PACIFIC VALLEY QUADRANGLE
CALIFORNIA–ALPINE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Base map prepared by the U.S. Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1974. Map edited 1979
Projection and 10,000-foot grid ticks: California coordinate system, zone 2 (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 11
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 13 meters north and 88 meters east as shown by dashed corner ticks
Modification to USGS base map by the Geometronics Service Center from 1980 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

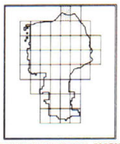


UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of 1985
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction
Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Road, Dirt
Trail
Locked Gate
Interstate Highway
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail


STANISLAUS NATIONAL FOREST

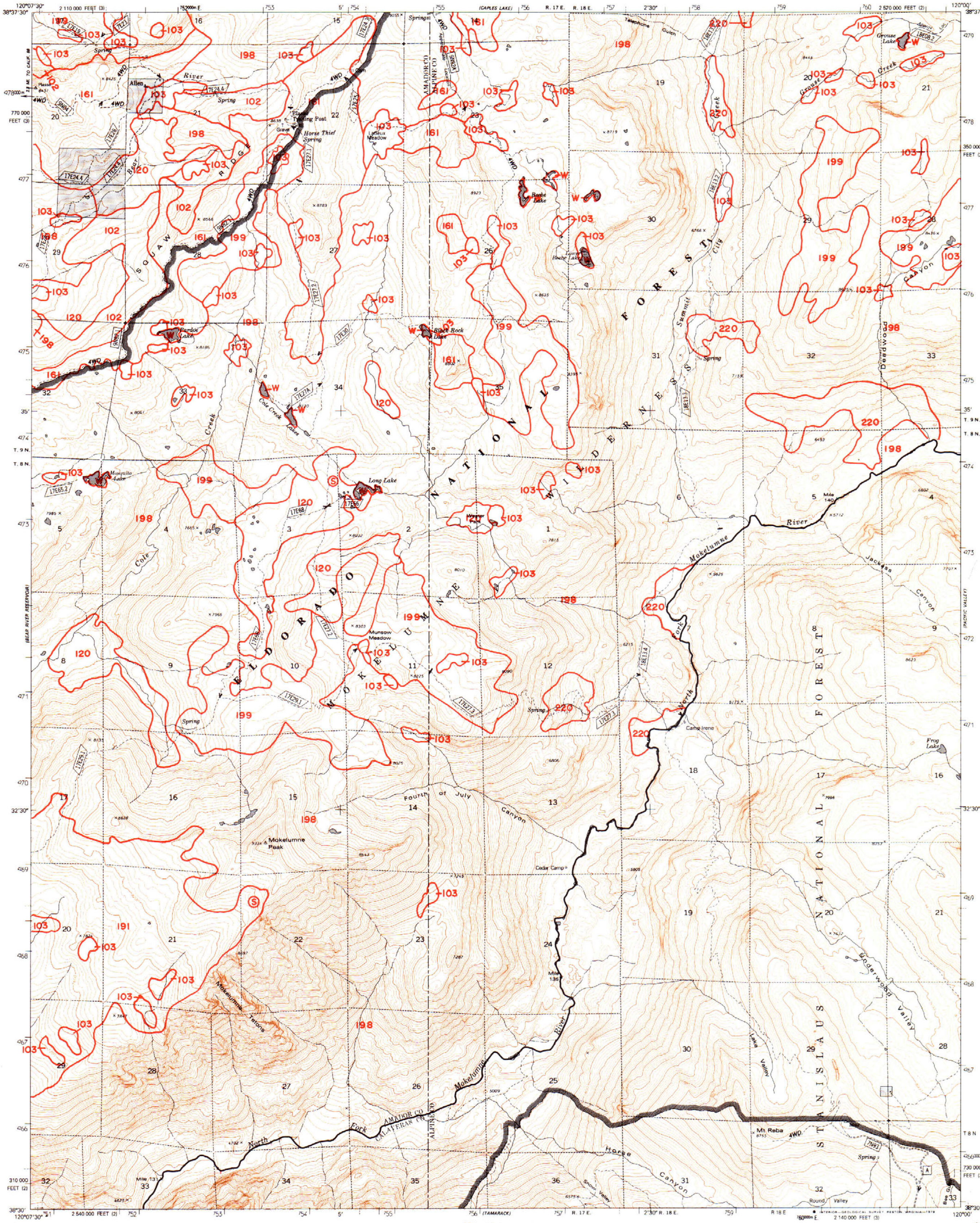
PACIFIC VALLEY, CALIF.
N3830 W11952.5/7.5
REVISED 1985

506-3C

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 34
MOKELUMNE PEAK QUADRANGLE
MT DIABLO MERIDIAN
CALAVERAS - AMADOR - ALPINE CO., CALIFORNIA
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1979

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

National Forest Boundary
Alienated Land within the National Forest Boundary as of March, 1985
Management Unit Boundary
Wilderness Boundary
Ranger District Boundary
Locked Gate
Barrier

Primary Highway
Secondary Highway
Paved Road
Gravel Road
Dirt Road
(Improved Light Duty)
Unimproved Dirt
Trail
Road, Location Approximate
Trail, Location Approximate

Interstate Highway
U. S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

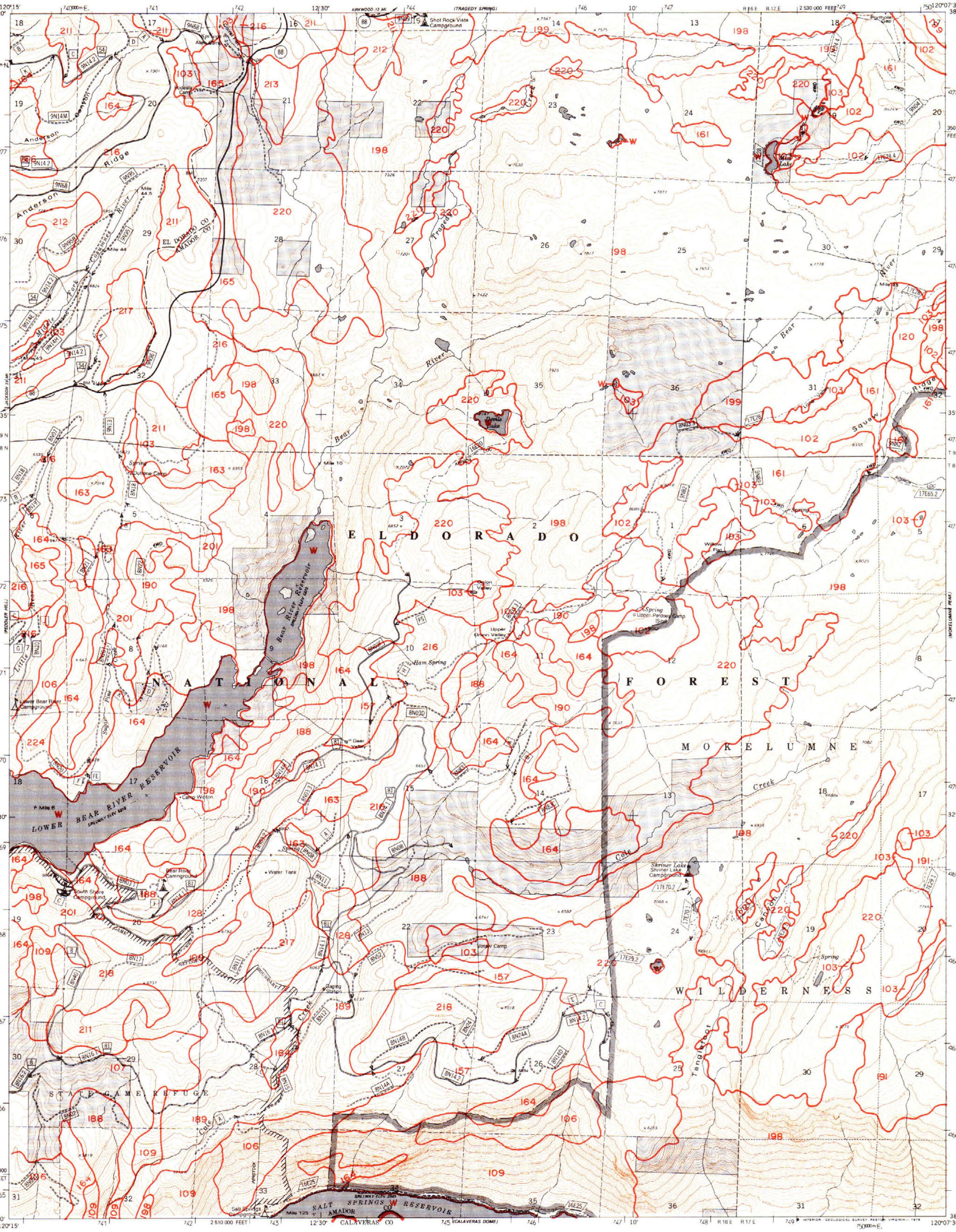
MOKELUMNE PEAK, CALIFORNIA
N3830-W12000/7.5
(507-4C)
REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 35

BEAR RIVER RESERVOIR QUADRANGLE
CALAVERAS-ELDORADO-AMADOR CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1979

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

1°45′ 31 MILS
16° 284 MILS

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

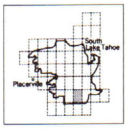
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road } Improved Light Duty
- Gravel Road } Improved Light Duty
- Dirt Road } Improved Light Duty
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction



ELDORADO NATIONAL FOREST

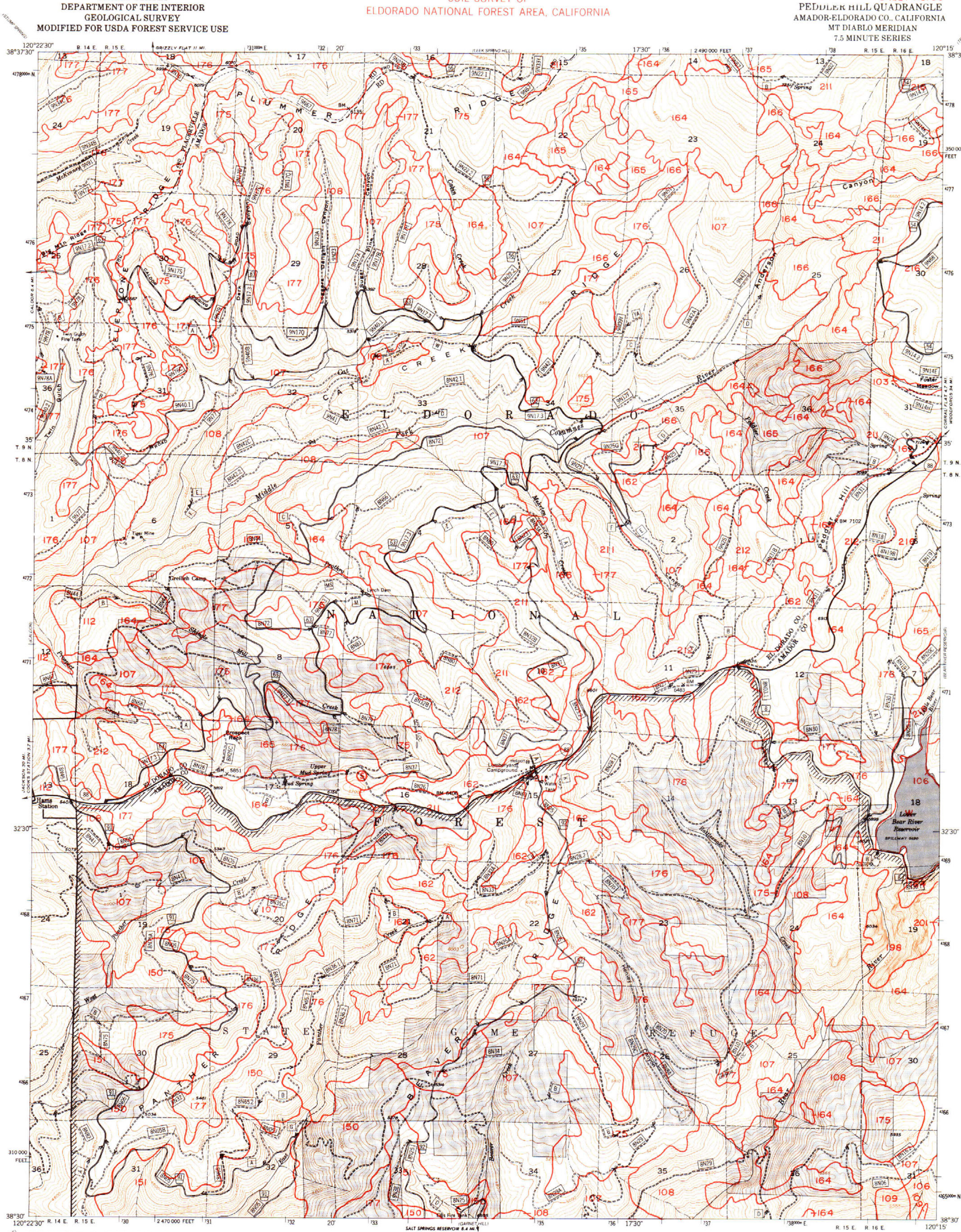
BEAR RIVER RESERVOIR, CALIFORNIA
N3830-W12007.5/7.5
(507-3C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 36
PEDDLER HILL QUADRANGLE
AMADOR-ELDORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U. S. GEOLOGICAL SURVEY

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs. Published in 1951

Revised by Geometronics Service Center in 1979

Polyconic projection. 1927 North American datum.
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10

Modification to USGS base map by the Geometronics Service Center from 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1°41′ 30 MILS — 16½° 293 MILS

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road — Improved Light Duty
- Gravel Road — Improved Light Duty
- Dirt Road — Improved Light Duty
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION

- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

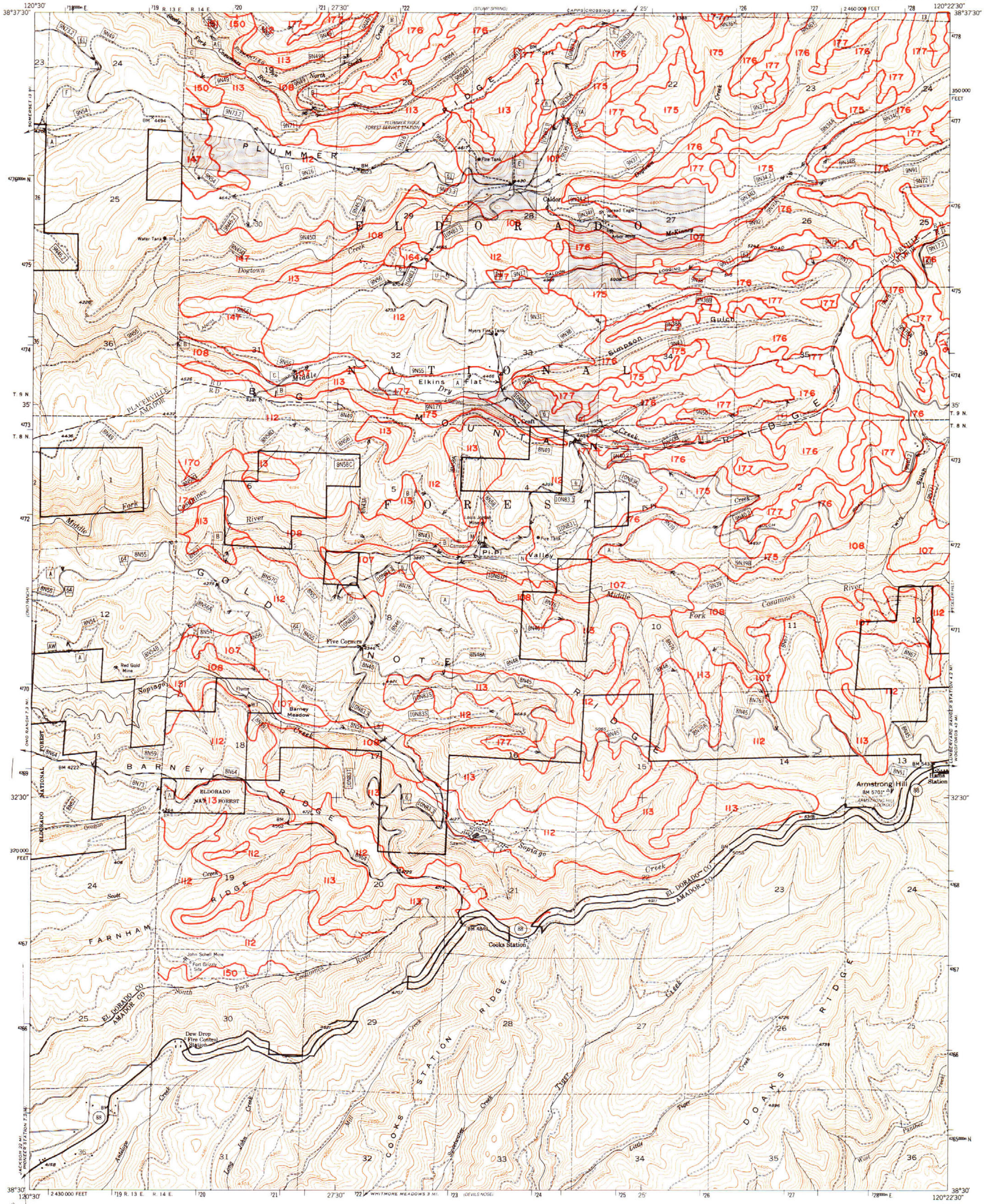
PEDDLER HILL, CALIFORNIA
N3830-W12015/7.5
(508-4C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 37
CALDOR QUADRANGLE
AMADOR-ELDORADO CO., CALIFORNIA
MT DIABLO MERIDIAN
7.5 MINUTE SERIES



BASE MAP PREPARED BY U.S. GEOLOGICAL SURVEY
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs. Published in 1951
Polyconic projection. 1927 North American datum
10,000 foot grid based on California coordinate system, zone 2
1000 meter Universal Transverse Mercator Grid, zone 10
Modification to USGS base map by the Geometronics Service Center from 1984 aerial photograph and 1985 correction guides furnished by the Pacific Southwest Region

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary as of March, 1985
- Management Unit Boundary
- Wilderness Boundary
- Ranger District Boundary
- Locked Gate
- Barrier
- Primary Highway
- Secondary Highway
- Paved Road
- Gravel Road
- Dirt Road
- Improved Light Duty
- Unimproved Dirt
- Trail
- Road, Location Approximate
- Trail, Location Approximate
- Interstate Highway
- U. S. Highway
- State Highway
- County Road
- Primary Forest Route
- Forest Road
- Forest Trail

TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Approximate
- Unsurveyed, Protraction

ELDORADO NATIONAL FOREST

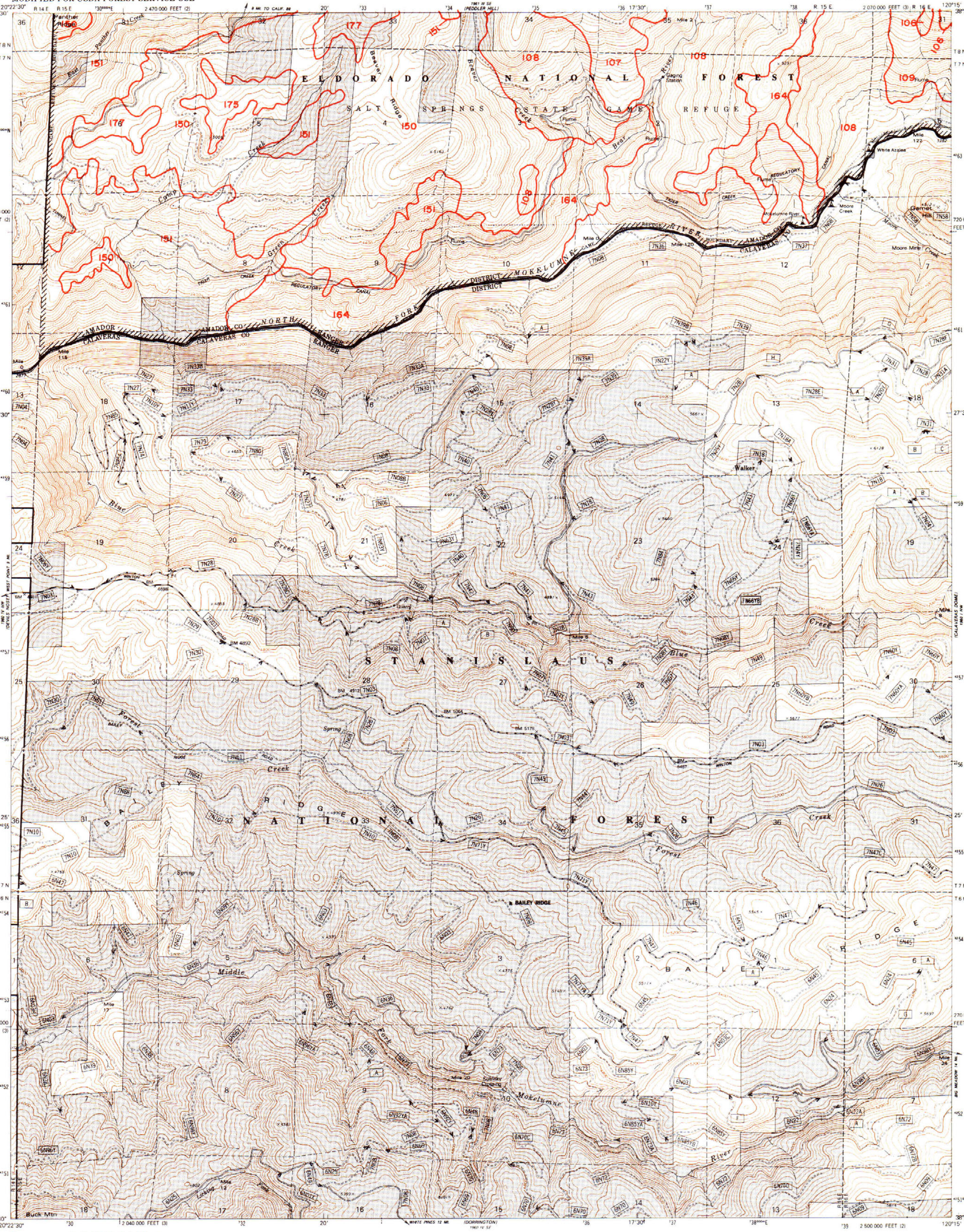
CALDOR, CALIFORNIA
N3830-W12022.5/7.5
(508-3C)

REVISED 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

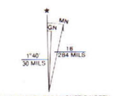
SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 41
GARNET HILL QUADRANGLE
CALIFORNIA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Base map prepared by the U.S. Geological Survey
Control by USGS and NOS/NOAA
Topography by photogrammetric methods from aerial photographs taken 1973 Field checked 1974
Map edited 1979
Projection: California coordinate system, zone 3 (Lambert conformal conic)
10,000-foot grid ticks based on California coordinate system, zones 3 and 2
1000-meter Universal Transverse Mercator grid, zone 10
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 13 meters north and 89 meters east as shown by dashed corner ticks

Modification to USGS base map by the Geometronics Service Center from 1980, 1982, and 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region



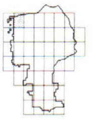
UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

National Forest Boundary
Alienated Land within the National Forest Boundary
Gate
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Road, Dirt
Trail
Road, Location Approximate

Interstate
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail
Trail, Location Approximate


STANISLAUS NATIONAL FOREST

GARNET HILL, CALIF.
N3822.5—W12015/7.5
REVISED 1985

492-1C

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 42
CALAVERAS DOME QUADRANGLE
CALIFORNIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

Base map prepared by the U.S. Geological Survey
Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1974. Map edited 1979

Underwater Contours by Pacific Gas & Electric Co.

Projection: California coordinate system, zone 3 (Lambert conformal conic)
10,000-foot grid ticks based on California coordinate system, zones 3 and 2
1000-meter Universal Transverse Mercator grid, zone 10
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 13 meters north and 88 meters east as shown by dashed corner ticks

Modification to USGS base map by the Geometronics Service Center from 1980, 1982, and 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

Landnet revised according to additional Forest Service evidence

GN MN
1°45′ 31 MILS
16° 284 MILS
UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1 MILE
7000 FEET
1 KILOMETER

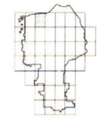
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

National Forest Boundary
Alienated Land within the National Forest Boundary
Gate

TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Road, Dirt
Trail
Road, Location Approximate

Interstate
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail
Trail, Location Approximate



STANISLAUS NATIONAL FOREST

CALAVERAS DOME, CALIF.
N3822.5—W12007.5/7.5
REVISED 1985

491-2C

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

SOIL SURVEY OF
ELDORADO NATIONAL FOREST AREA, CALIFORNIA

SHEET NO. 43
TAMARACK QUADRANGLE
CALIFORNIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

Base map prepared by the U.S. Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1974. Map edited 1979

Projection: California coordinate system, zone 3 (Lambert conformal conic)
10,000-foot grid ticks based on California coordinate system, zones 3 and 2
1000-meter Universal Transverse Mercator grid, zone 10
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 13 meters north and 88 meters east as shown by the dashed corner ticks

Modification to USGS base map by the Geometronics Service Center from 1980, 1982, and 1984 aerial photography and 1985 correction guides furnished by the Pacific Southwest Region

Landnet revised according to additional Forest Service information

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

National Forest Boundary
Alienated Land within the National Forest Boundary
Gate
TOWNSHIP AND SECTION LINE CLASSIFICATION
Surveyed, Location Reliable
Surveyed, Location Approximate
Unsurveyed, Protraction

Primary Highway
Secondary Highway
Improved Road, Paved
Improved Road, Gravel
Improved Road, Dirt
Unimproved Road, Dirt
Trail
Road, Location Approximate

Interstate
U.S. Highway
State Highway
County Road
Primary Forest Route
Forest Road
Forest Trail
Trail, Location Approximate

STANISLAUS NATIONAL FOREST

TAMARACK, CALIF.

N3822.5–W12000/7.5

REVISED 1985

491-1C